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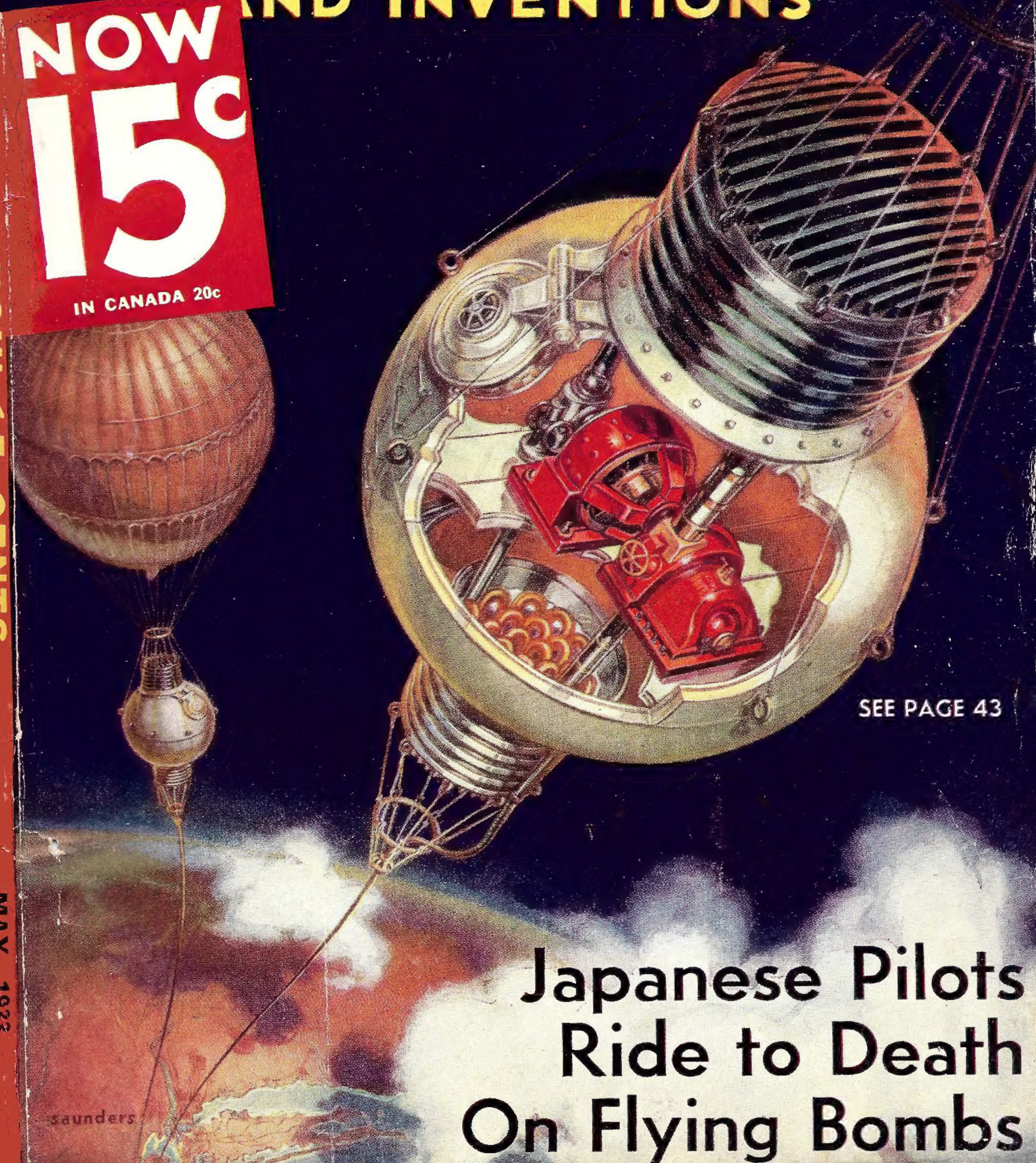

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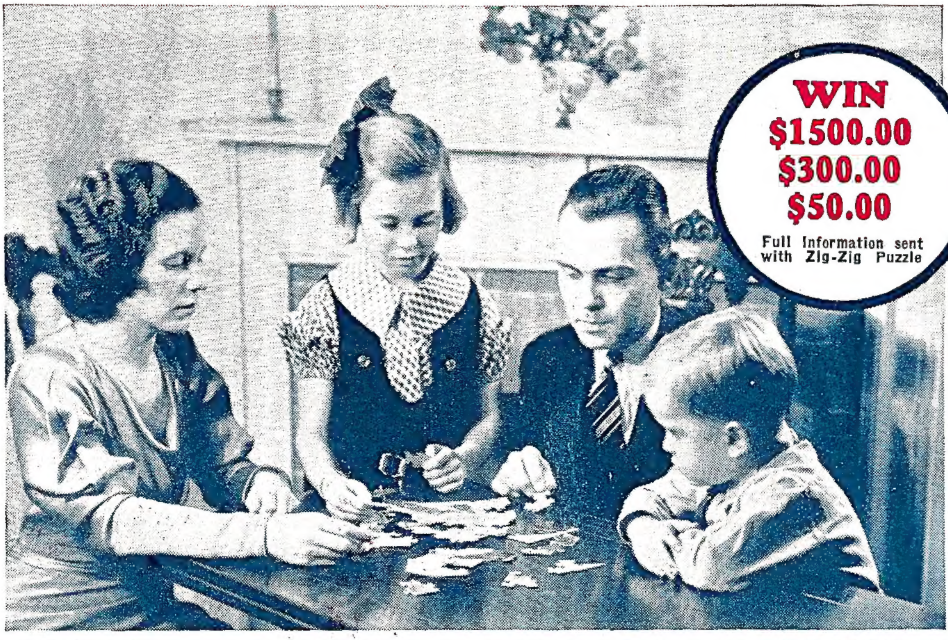
Japanese Pilots Ride to Death On Flying Bombs

ZIG-ZIG *puzzle* GIVEN



WIN
$1500.00
$300.00
$50.00
Full Information sent with Zig-Zig Puzzle

SHARE *in my* HUGE CASH PRIZE DISTRIBUTION

Here's something that's new! . . . as new as tomorrow or the latest fashion from Paris . . . and fun for all! Do you like Puzzles? Well, try my new ZIG-ZIG . . . grown-ups find it fascinating; children like it, too! It's the game of today . . . sweeping the country by storm . . . your name and address with 10c in coin or stamps to pay postage and handling will bring it prepaid, and with it the opportunity to share in my distribution of

$6,000.00 *in* CASH PRIZES

Yes, I mean it. Hundreds and thousands of dollars in cash prizes . . . *a part of it may be yours* . . . if you are over 16 years old and reside in the United States proper, it's an opportunity, yes the chance of a lifetime! You'll marvel at its simplicity. Send today for your Zig-Zig Puzzle and *complete details.*

We have paid prizes to men and women in all walks of life, even school children . . . BUT I have a plan now that's got 'em all beat! Imagine, a big cash prize for only a few moments time . . . it's true, every word of it. You owe it to yourself, your loved ones, to learn of my new prize plan .

EVERYTHING TO GAIN—WRITE TODAY!

There is no possible way for you to lose anything—nothing for you to risk! Just send me your name and address, on a sheet of paper or the coupon, with 10c in coin or stamps. Get this new and interesting Zig-Zig Puzzle.

Do This Today

I will send your Zig-Zig Puzzle by return mail PREPAID and with it complete information about my new, simple prize plan. The cash prizes must be given away . . . there's nothing for you to lose . . . everything to gain!

TOM WOOD, Mgr.,
906 Sycamore St.,
Cincinnati, ▪ Ohio

BE PROMPT
Act Today to Win $100.00 Extra!

Send for your Zig-Zig Puzzle within three days after reading this announcement and I will send you a Cash Promptness Certificate guaranteeing $100.00 extra to First Prize Winner. Who knows, the winner may be you! It pays to be prompt!

ZIG ZIG PUZZLE COUPON

TOM WOOD, Mgr., Dept. E-53-E
906 Sycamore St., Cincinnati, Ohio.

I am enclosing 10c in coin (stamps) for my Zig-Zig Puzzle. Also please send me your new, simple prize plan.

My name is..

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Town .... *State*...................

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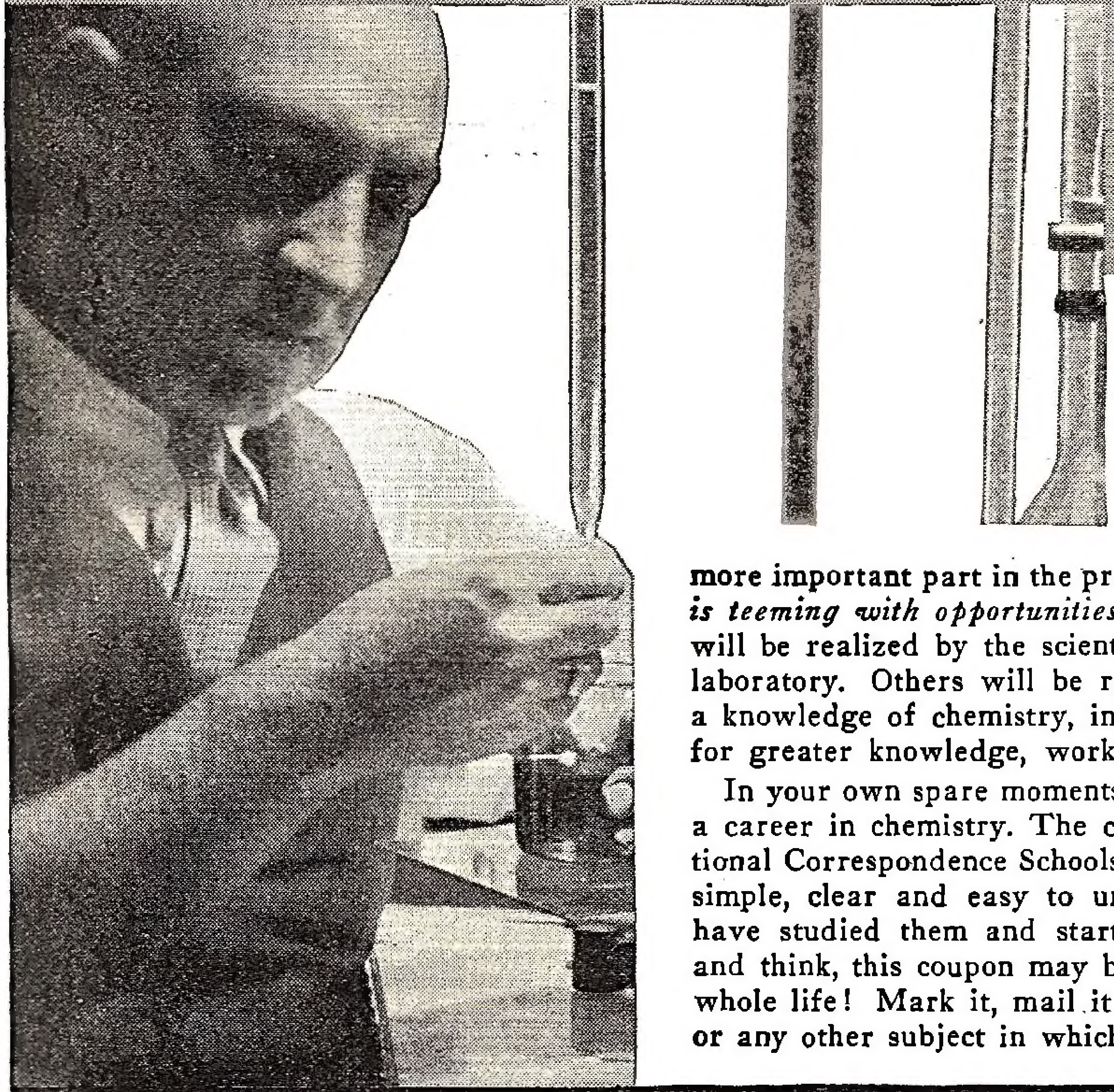

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MAY, 1933

VOLUME X
NUMBER 1

MODERN MECHANIX AND INVENTIONS

Donald G. Cooley
EDITOR

PRICE 15 CENTS
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Published monthly by Modern Mechanix Publishing Co., at 529 7th Street So., Minneapolis, Minn. MODERN MECHANIX AND INVENTIONS entered as second class matter September 20th, 1928, at the Post Office, Minneapolis, Minn., under the act of March 3rd, 1879. Jack Smalley, Managing Editor. Copyright 1933. Advertising Offices: Chicago office, 35 East Wacker Drive (Phone State 2955); New York office, 52 Vanderbilt Ave., Room 1603 (Phone Murray Hill 2-1555). All manuscripts should be addressed to our editorial office at 529 So. 7th Street, Minneapolis, Minn. Manuscripts will not be returned unless accompanied by return postage. Advertising forms close on the 20th of the third preceding month. Price 15 cents a copy; $1.50 a year in the United States and possessions. In Canada, 20c per copy; per year $2.25. Other Postal Unions, $2.00 per year. Printed in U. S. A.

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EDITED BY EXPERTS

Listed here are the members of the Modern Mechanix Board of Editors, all qualified by national repute to serve as authorities. They will gladly answer questions from readers if stamped envelope is sent. Address them in care of this magazine, 529 S. 7th St., Minneapolis, Minn.

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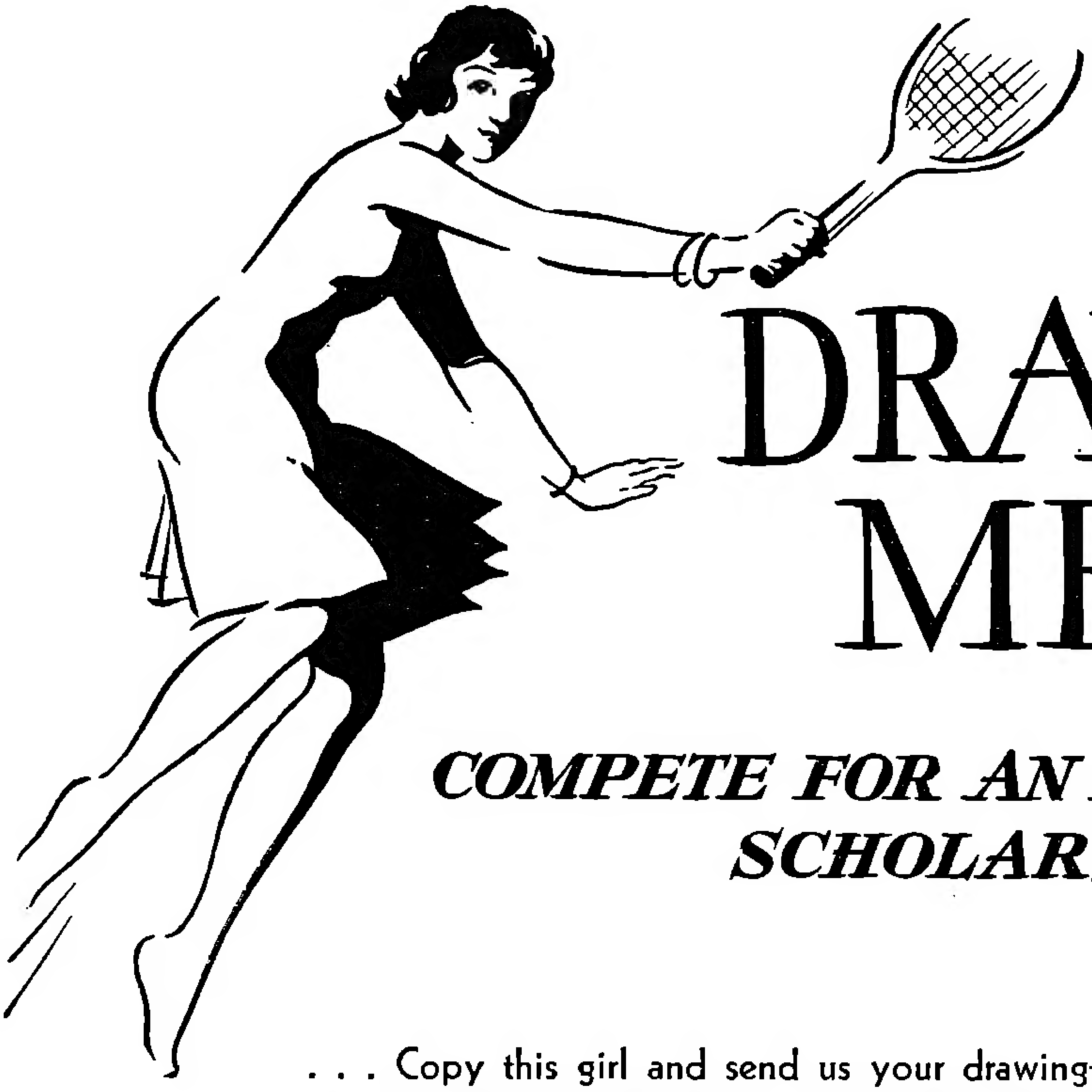

DRAW ME!

COMPETE FOR AN ART SCHOLARSHIP !

. . . Copy this girl and send us your drawing—perhaps you'll win A COMPLETE FEDERAL COURSE FREE! This contest is for amateurs (16 years of age or more), so if you like to draw do not hesitate to enter.

RULES FOR CONTESTANTS

This contest open only to amateurs, 16 years old or more. Professional commercial artists and Federal students are not eligible.

1. Make drawing of girl 5½ or 6 inches wide, on paper 6½ inches square. Draw only the girl and not the lettering.
2. Use only pencil or pen.
3. No drawings will be returned.
4. Write your name, address, age and occupation on back of drawing.
5. All drawings must be received in Minneapolis by April 25, 1933. Prizes will be awarded for drawings best in proportion and neatness by Federal Schools Faculty.

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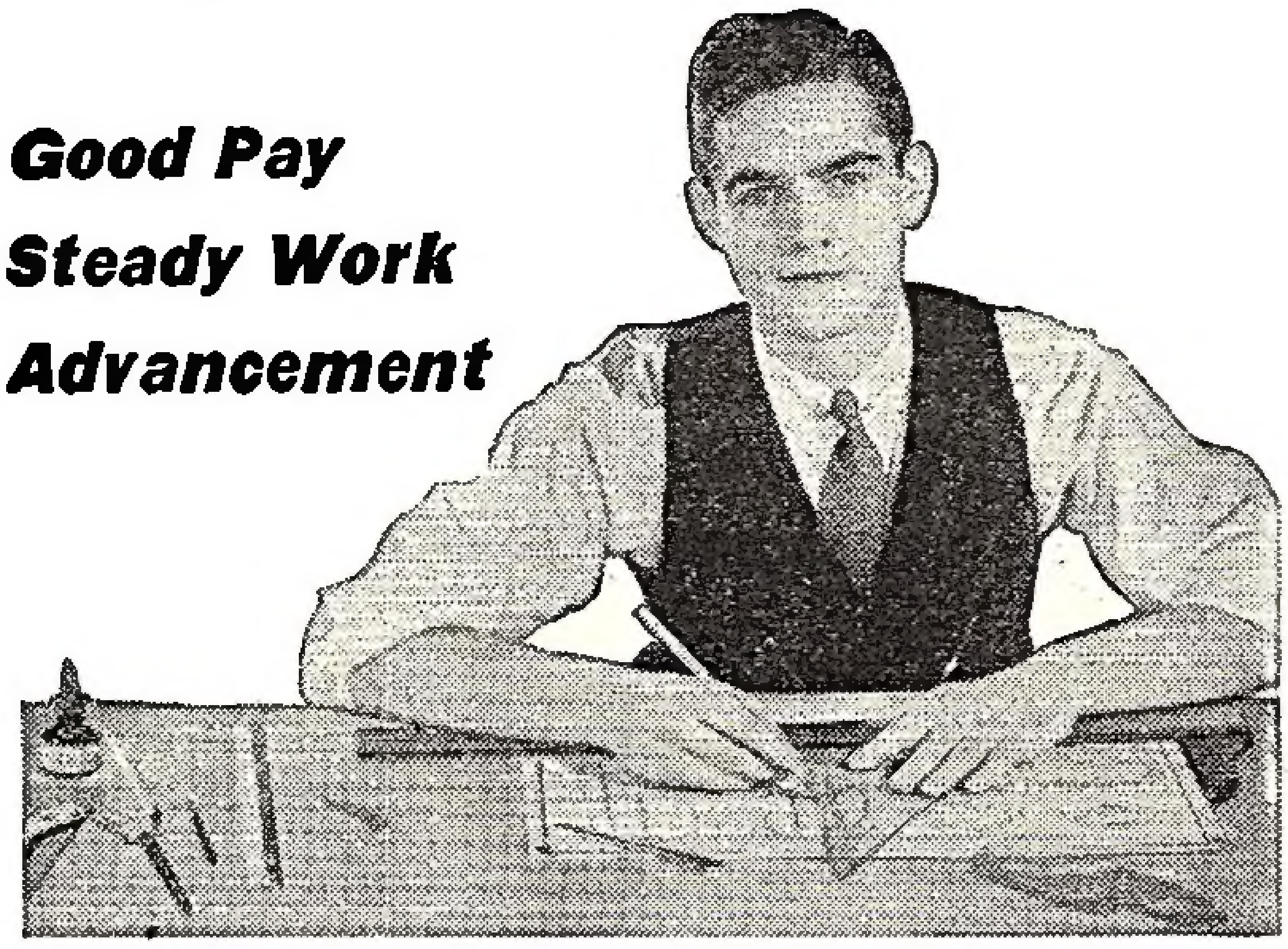

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THE UNIVERSITY OF THE HOME

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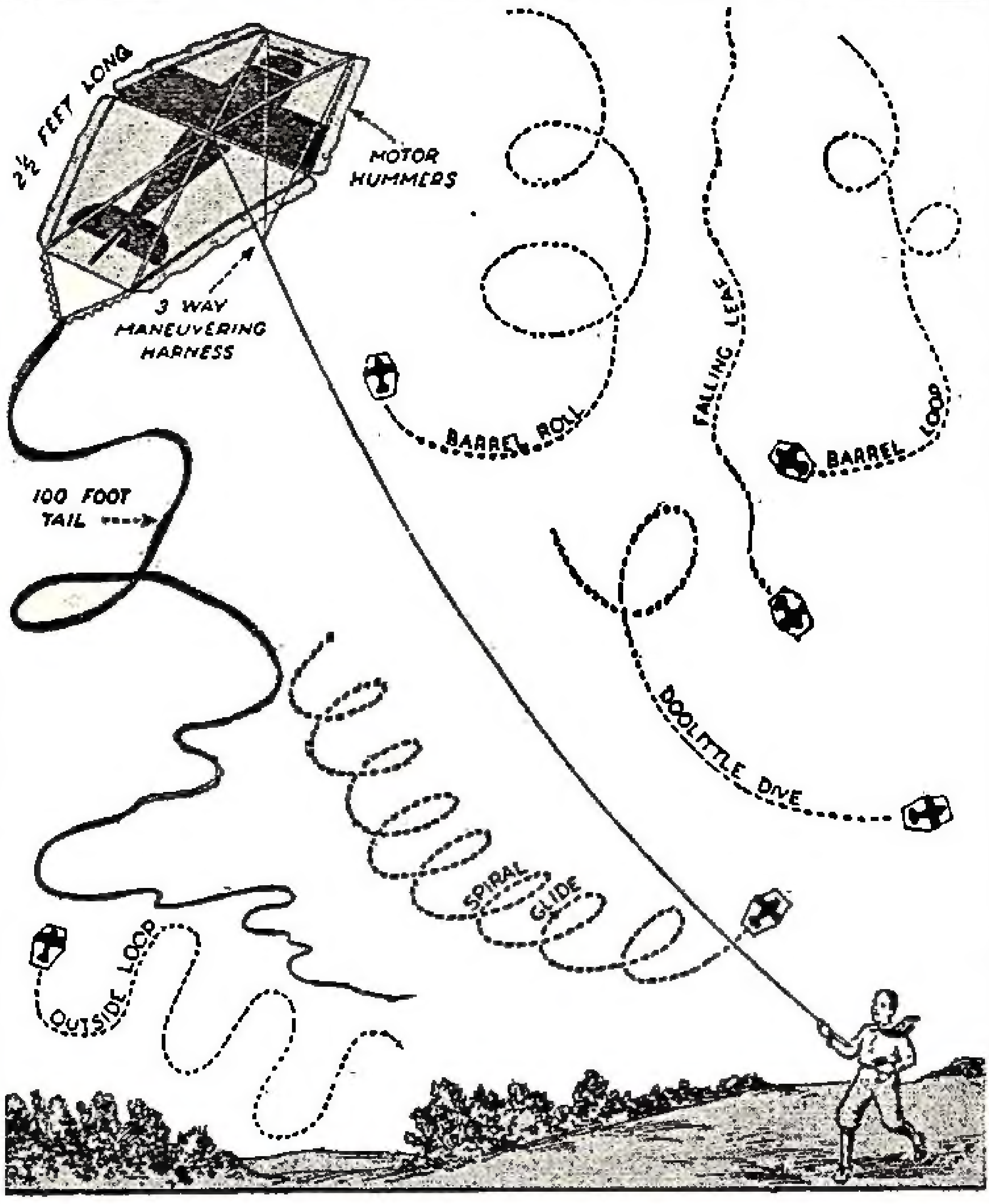

By jerking on the string at proper intervals this big kite is made to do any stunt a good pilot can do. This shows only a few. Note the 100-foot tail. Kite comes complete in big box, ready to fly.

This Big Kite Complete *only* 49¢

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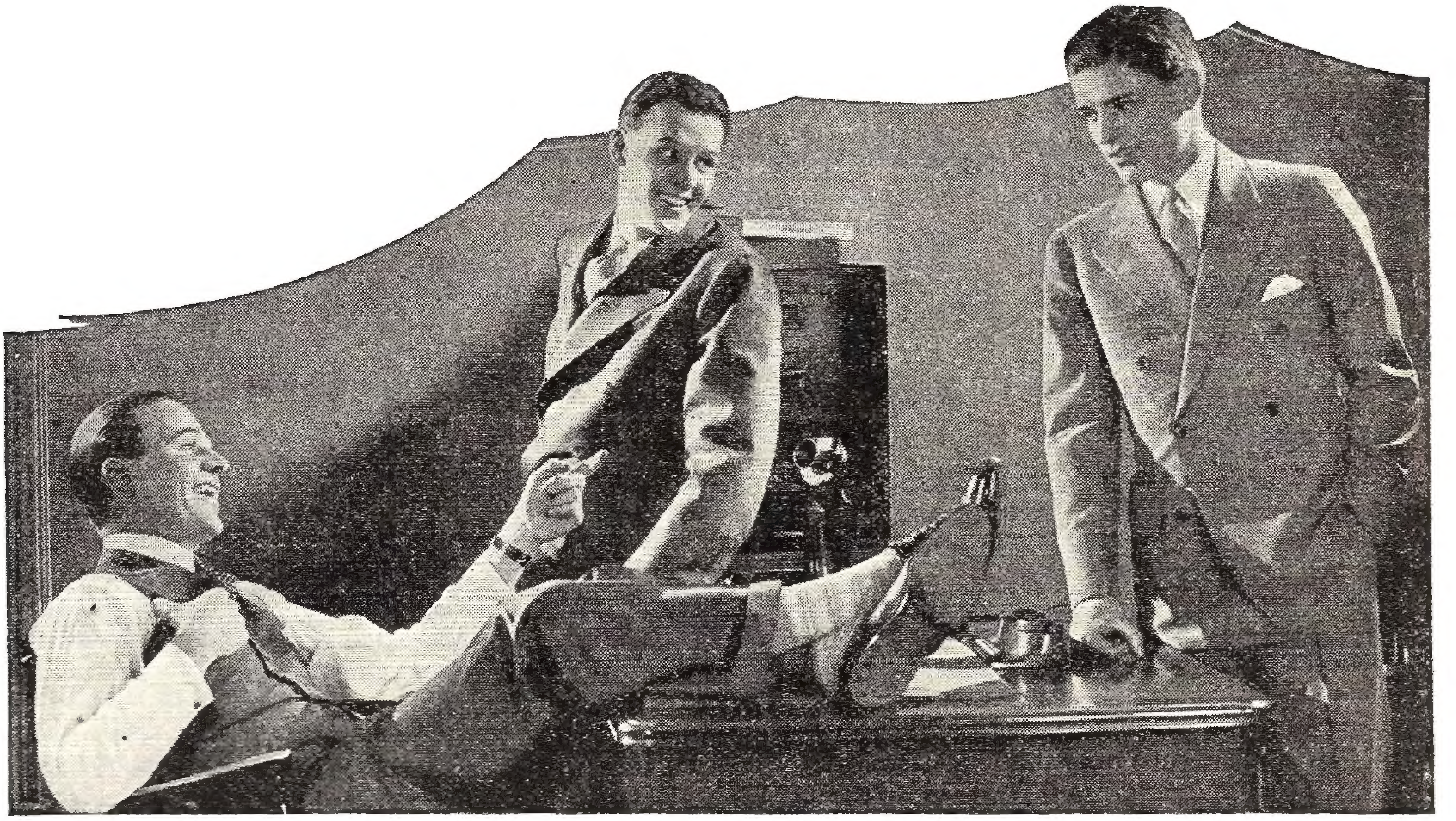

"Enter the Radio Business? ...*YOU'RE FOOLISH!*" they Shouted

—yet in a few months I was earning more than any of them

You should have seen their faces when I told them that in just a few short months I jumped from $35 to $75 a week.

"No more scrimping and saving pennies for me!" I said. "I've got a new car, and before long I'll have a home of my own. No more slaving for a boss, either. I'm my own boss since I went into Radio—and the work's like play."

Just a short time ago they had laughed at my decision to enter the Radio business. "You're foolish! You'll lose your shirt," they roared. "You're no mechanic, you don't even know the difference between a grid and a primary coil."

And now it was my turn to laugh. They were astounded that I made such a success in so short a time. They fired questions at me from all sides. How did I do it? Where did I learn? What school did I go to?

"I didn't go to any school at all," I told them. "I learned right in my own home—in my spare time—the quick, easy National Radio Institute way. It was actually fun learning. Everything was right before me—working outfits of parts, and instructions with pictures that showed me exactly how to do everything. I could hardly help learning. And best of all, almost from the very first lesson I was able to earn money in my spare-time fixing sets in my neighborhood. Before I had been studying three months I more than paid for the price of the course. I'll say that Radio is the biggest paying business I ever found!"

This story is typical of hundreds of National Radio Institute students all over the country. Young men with ambition and foresight everywhere are getting into Radio now. Wm. Spartivent, 93 Broadway, Newark, N. J., lost his job, turned to Radio, and has averaged $3,000 a year. B. Morissette, 733 Somerville St., Manchester, N. H., writes that he still has his regular job but averaged $80 a month in Radio work in spare time.

The amazing growth of Radio has opened hundreds of new jobs for trained men. Radio manufacturers employ testers, engineers, service men, and buyers for jobs paying up to $6,000 a year. Broadcasting Stations use engineers, operators, station managers and pay up to $5,000 a year. Hundreds of operators enjoy world-wide travel and adventure in the employ of shipping companies with all expenses paid and a good salary besides. Talking Movies pay as much as $75 to $200 a week to men with Radio training. Radio dealers employ trained men to buy, sell, install, and service sets, and pay well for good men.

Opportunities for ambitious men in Radio are almost unlimited. An amazing 64-page book called "Rich Rewards in Radio" tells all about the many opportunities you can find in Radio—and this book will be sent to you *absolutely free!* It will also tell you about the famous National Radio Institute plan that has helped others to earn $50, $60, $75 a week and more; also all about the remarkable lifetime employment service.

The National Radio Institute course is *thorough.* You learn by actual practice with working outfits, not just by theory alone. First, you are told how to do it, then you see how by photographs, and then you do it yourself. Even the most modern and complicated sets hold no secrets from you. Yet this amazing course is simple, easy to master.

No need to give up your present job. Keep it until you prove to yourself that Radio will raise your pay. For the National Radio Institute course is guaranteed—if when you complete it you aren't fully satisfied with the lessons and instruction service, every cent you paid will be instantly returned.

Send the coupon below at once for the book, "Rich Rewards in Radio." It will be sent to you absolutely *free!* Learn how many have more than doubled their pay—see for yourself the wonderful opportunities for you in Radio. No obligation. Mail the coupon right now.

National Radio Institute, Dept. 3EH,
Washington, D. C.

Gentlemen: Send me your book. I want to see what Radio offers. I understand this request does not obligate me.

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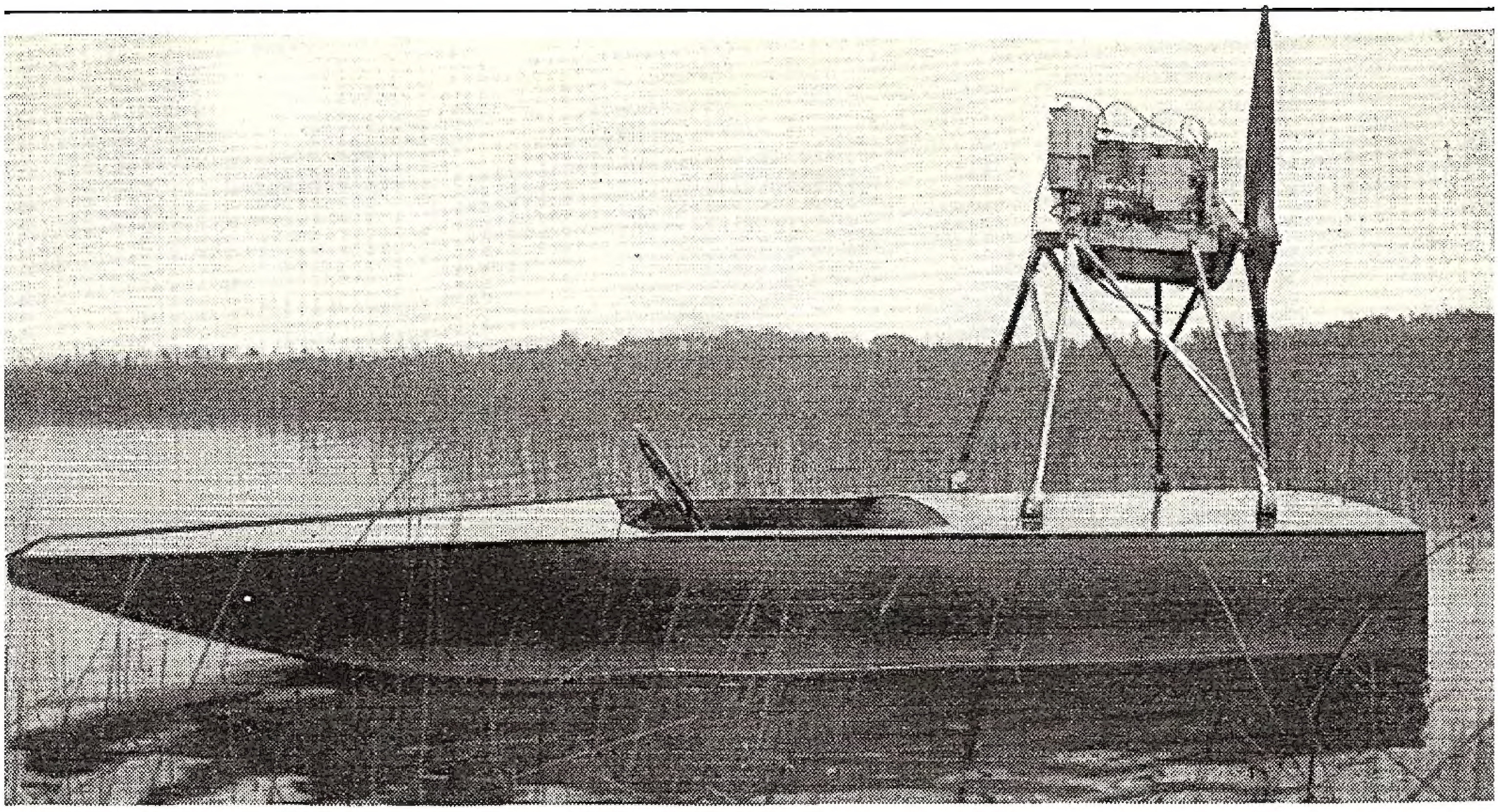
City .... State..................



Lawrence Pykosz, of Hammond, Indiana, drives this light skimmer with a Henderson motor. A speed of 35 miles can be maintained in a heavy dew, on account of the boat (says Andy) has nothing on the bottom but the usual paint.

Andy's Shop Mail Box

Herewith is the harrowing tale of a pig who made a jump without a parachute, and how he applied at Andy's abode for flying lessons in the dark of night, adopting Andy as a step-dad.

MAYBE it's the spring fever. I dunno. But I been moonin' around the hangar for three days now hoping to hit on a good punch line to start the bleat out this month. I been writing about Kings and Queens and fancy aviators (local canned variety) so long that I sorta out of habit look for something like that to remark about first off.

But the king and queen business ain't what it used to be, I haven't got enough energy to keep from murdering my pronouns and verbs, and the home grown air cowboys ain't been hedge hoppin' much what with the soft field, I have decided to write about a pig.

Yessir, you really don't know me till you know about my Irish bedfellow. A nice little Hampshire boar I found by the roadside one night.

* * *

A couple of weeks ago I heard the gol darndest squealing outside the hangar. I woke up with a start, pulled on my boots, turned up the wick in the lantern, and fetched forth to quell the riot outside the door.

I found the hungriest, shiverinest little shoat you ever see, blacker than all the colors of midnight colored black.

This animated strip of pork scuttled inside the hangar and ended up in my bed like a long lost brother. It was colder than charity outside, and I peered acrost to the main highway leadin' past the field. I figgered some farmer had been drivin' to market, and that this little hunk of pork had smelled airplane, stuck his nose out between the slats of the farmer's truck, figgered he had a tail wind and was out of fuel, so he sailed out into the night forgetting his parachute. A born aviator—catch the idea?

That's the first time I ever had a flyin' student apply for lessons in the middle of the night.

I cleaned the bed up, stuck piggie near the stove where he swore and cursed all night long. Next day I rigged up a helmet to hold bran mash so he could nuzzle it, and now the magazine and the field and old Andy have a mascot.

He's learning the flying game, and his name is Parachute.

* * *

Today he's King of the Tarmac, tomorrow he's Ham.

* * *

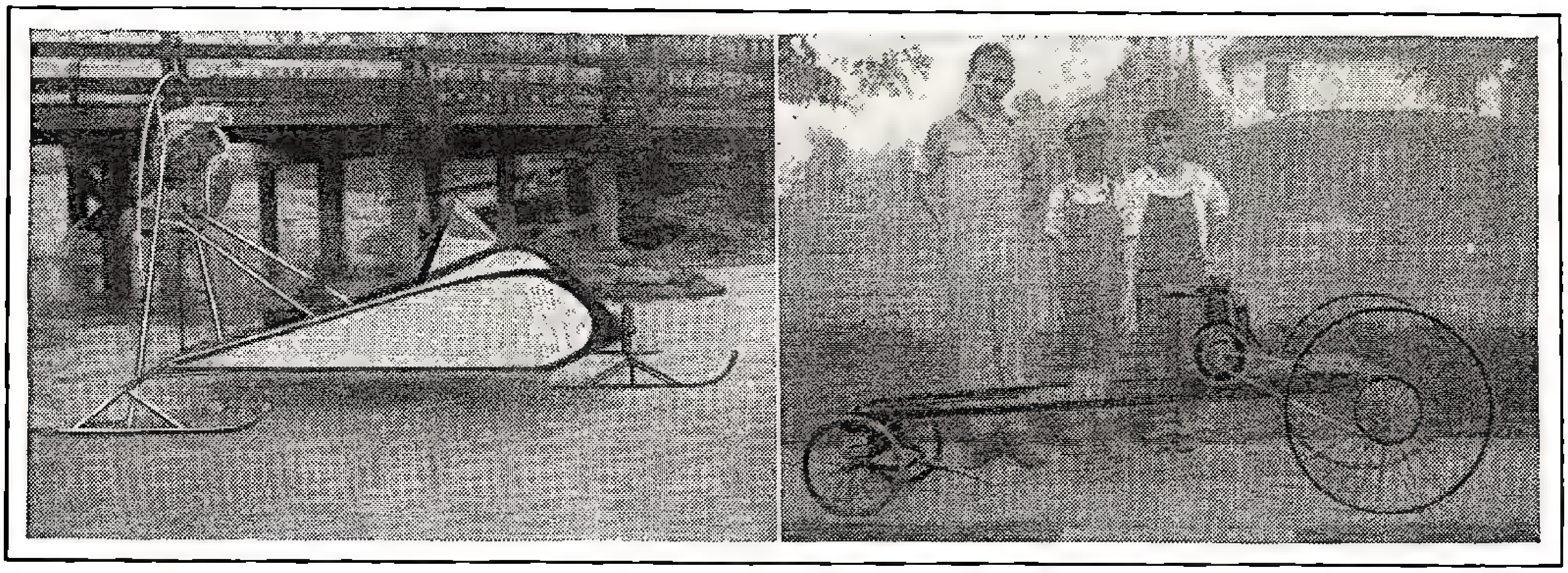
But now that we have a mascot and I've got this bucket of tripe going, let's have a look into what the Gang has been up to since the last effusion of colorful hooey.

Take a look at the little airdrive boat whose pix graces the head of this month's col.

No it is not Whizzer as designed by Westy Farmer, but Whizzer was her inspiration. No, she doesn't go so fast that her bottom burns up right on the water. No, she—well, let's let her builder sound off:

Dear Andy:

I am sending you a picture of the boat which was built from one of the many issues of Modern Mechanix books I have.



Step right up gents! On the one hand we have a nifty little ice sled built right in airplane fashion out of steel tube by Guy Nelson, of Council Bluffs, Iowa. The town of Council may be built on a bluff, but the sled is not run on the same principle. T'other side shows three fine lads old Andy is proud of. Their own home-built car is with 'em. Meet Buddy, Billie and Darrel, Gang!

The boat was of my design (I mean the body). I used a Henderson engine but the prop was home made. It did not take much water to put it in because it was so light. It's 12 feet long, and makes about 30-35 mi. per hr. Wish you would put the picture in your column, as I am a good reader of your book.

Yours truly,
Lawrence Pykosz,
4222 Wabash Ave.,
Hammond, Ind.

Why, sure, Larry—you are a good reader of Modern Mechanix. I don't doubt that your bus makes that speed, but bear in mind Gang, that that hull is light, or it'd never get up on top. Once out and on the surface, it doesn't take much power to step the speed up. Most builders of this kind of boat get their hulls too heavy, their power too low.

* * *

And next we have the second 32 em cut—the one of the sweet little neat little fleet little aero ice sled built of steel tube by Guy Nelson, of Council Bluffs, Ia., who says:

Council Bluffs, Iowa.

In your Dec. 1931 magazine you published a picture of an ice boat sent in by Ed. Schneider of Schenectady, N. Y. I thought it a mighty neat outfit, so decided to construct one. This one is made entirely of steel tubing, welded. It is covered with fabric. We used it some last winter but made a few changes in it this year. It works perfectly.

Guy Nelson.

It is fun to run pix of home vegetated stuff like this, because it shows that our ideas are permeating into intelligent minds who are willing to take advantage of the experience we have plastered into this well known Family Almanac.

* * *

Three good troupers who have waited for quite a while to see their little wagon in print (full spindle here, gents) are Buddy Henry, Billie Mason and Darrell Boyles. They sent quite a long letter and I've had to wait until I got room to run it. Listen:

1107 23rd Street.
Fort Madison, Iowa.

Dear Andy:

I have been a reader of the M. M. for a long time but as yet have never sent in any articles or pictures, so I have decided to try my luck at having one of the pictures and the letter published in your mag.

I am sixteen years old and Billie Mason and Darrell Boyles are 12, respectively. We have endeavored to build what is known to our neighborhood as the "What-you-may-call-it." It is a crude design of a midget auto which I have put together with my own ideas after several tries with various washing machine motors.

As you can see from the picture the auto is not much for looks, but it serves the purpose very satisfactorily. We have obtained tricycle wheels for the front and wheel-chair wheels for the rear. The steering apparatus is not so clever but it works as a brake and as a steering apparatus as well. Angle iron serves as the frame and has one inch pine boards for the cross pieces. A small washing machine motor is used which develops ¾ horsepower. We have a direct belt drive with a six to one ratio, for an increased power.

We go right down the street at a 18 m.p.h. clip with little difficulty in keeping out of the way of passing motorists. We can run all day on one quart of gasoline, which the tank holds.

You may use any part of my letter for publication or all of it as you wish.

Anyone interested in model autos please write to me as I am very interested in such. Am going to build a much neater rigging powered by an Indian single cylinder of the 1918 model machine with a friction clutch.

Hoping to see my picture and letter in print I remain a faithful and anxious reader of the double M.

An Auto Pal,
Buddy Henry,
Billie Mason,
Darrell Boyles.

* * *

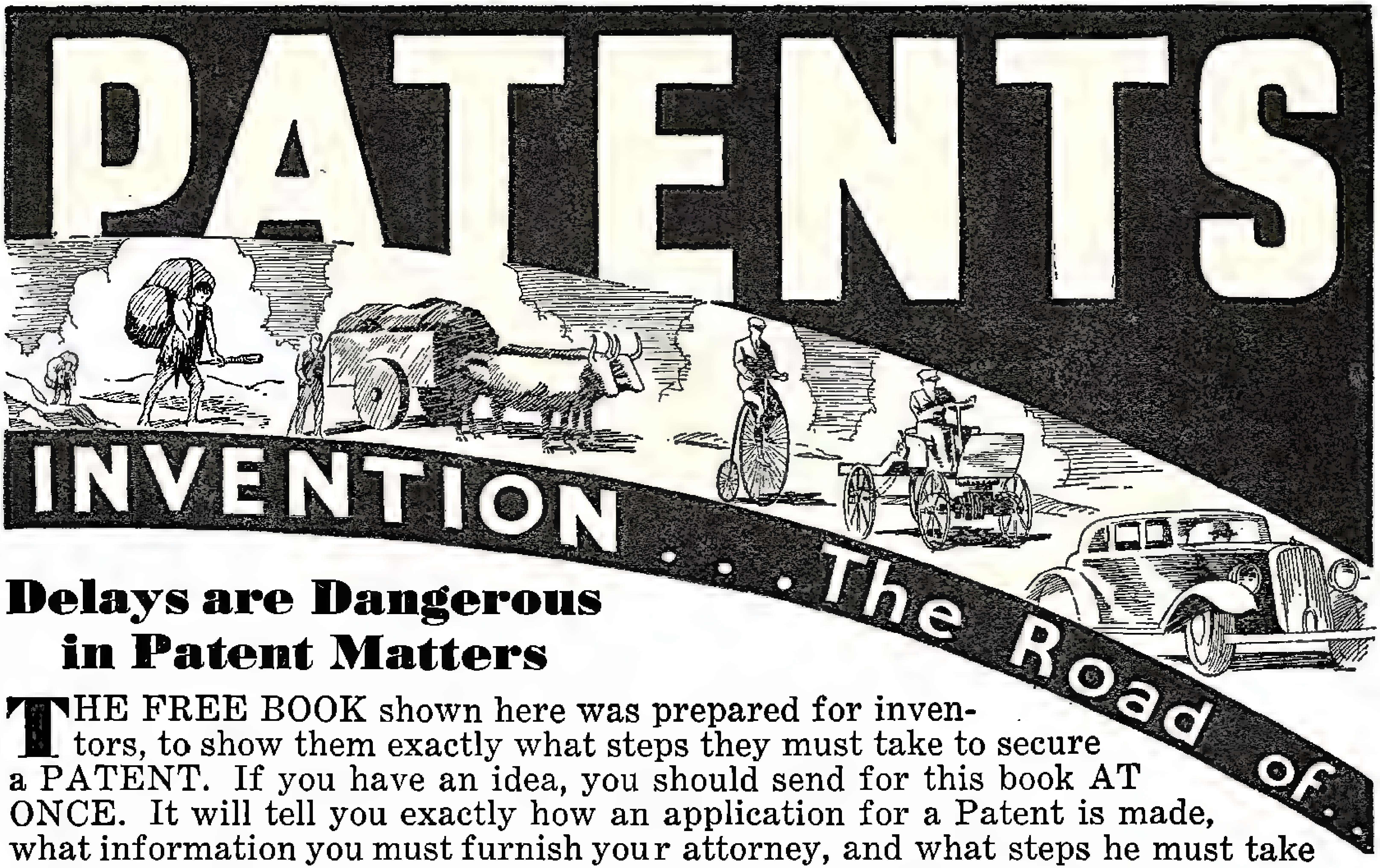
From way up in the cold country, where the snows have probably not yet started to melt, comes a letter from H. Bergman, of Norman, Ontario.

Note the chilly billy surroundings.

Dear Andy:

Here are a few pix of my snow sled. The specifications and other data are as follows:

(Continued on page 14)



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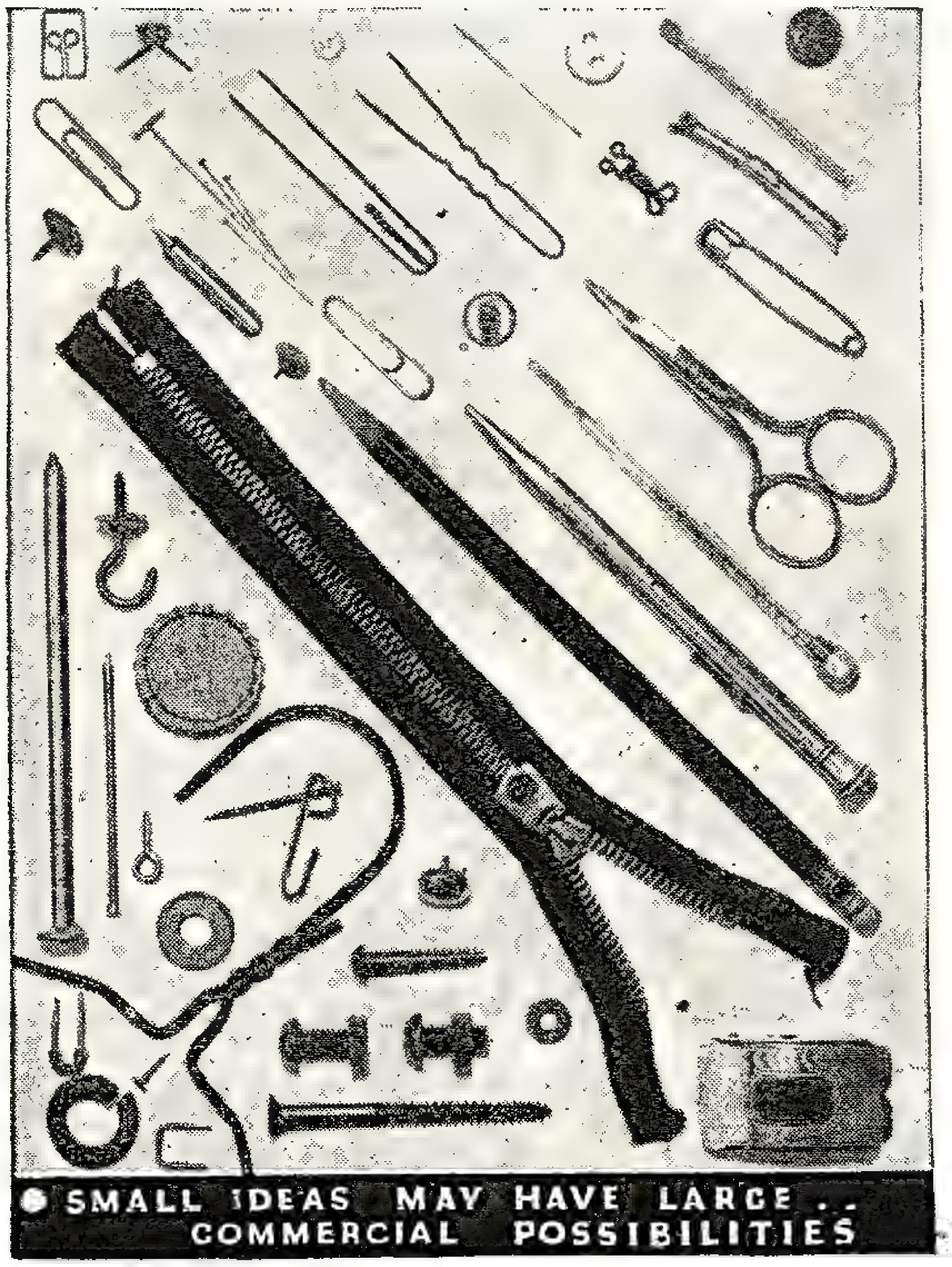
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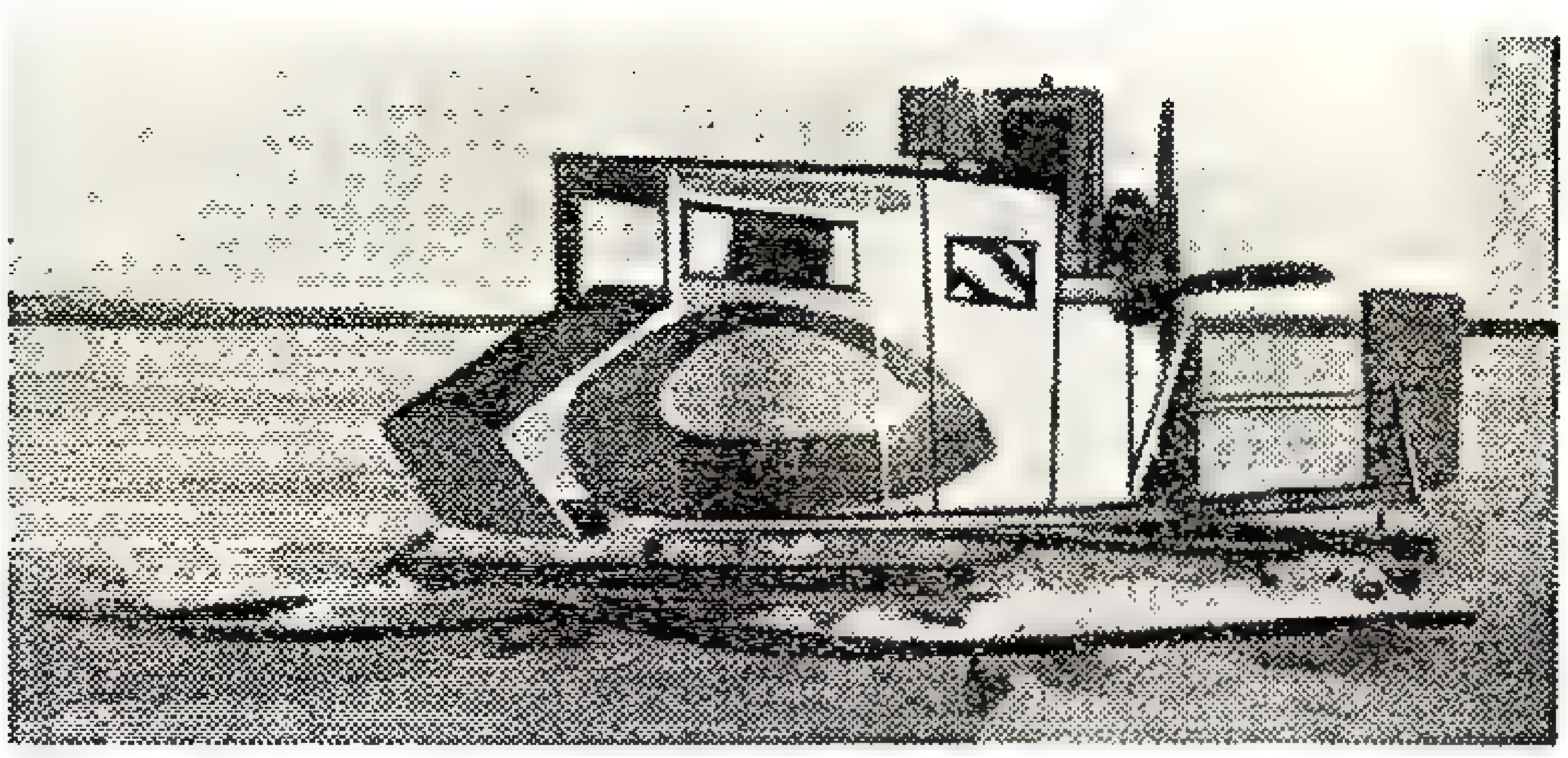
ANDY'S SHOP MAIL BOX

(Continued from page 11)



Henry Bergman of Norman, Ontario, built this puddle flyer and makes 30-ft. leaps across open ice—if it is not too open.

Skis—14 feet long, 12 inches wide, the edges being beveled. The span from center of one ski to center of the other is 8 feet. The over-all length of the completed sled is 19 feet 6 inches. It is powered with a Chev. of my own conversion. Turning a 4-foot, 6-inch four-blade prop with a 46-inch pitch at 2,000 R.P.M.'s. I am putting a new one on to hold it down to 1,600 R.P.M.

The speed on moderately soft snow is 40 to 50 miles per hour with one or two passengers, the skis sinking 2 to 3 inches. I expect more speed on hard snow but have not had any as yet. The day these pix were taken it was very mushy. The skis sinking from 4 to 7 inches and slush all over the ice, so I could only get 30 to 35 per at top speed.

The sled rests on coil springs and is very flexible, the springs and axles allowing an up and down movement of the skis up to 2 feet, 6 inches, as the front axle is secured only at the center.

If you are interested I can furnish you with plans and the instructions for building the sled and converting the motor. My sled will jump an airhole 30 feet long traveling at 40 per. Pretty near met my "Waterloo" the day I took these pix. Too many holes in succession to be comfortable. I can also get you the plans for my Fire Fly of last season. You have the pictures of it. Hoping to be of service to you, I am,

H. Bergman,
Box 355,
Norman, Ontario,
Canada.

P. S. I have read your magazine since you published the plans for the Heath Parasol and never had any reason for complaint. Shoot a few of the grumblers and watch the wheels go 'round. I built a sport plane too, but I had too much ambition and short on brains and experience.

I get a bang out of Mr. Bergman's little "sermoan" in his postscript. Months of toil, dreaming and final defeat are summed up in the phrase "too much ambition and short on brains and experience." Out of such stuff are flyers made.

* * *

I frequently get letters from fellows who want to find a motor, or a prop, or something else on

(Continued on page 16)

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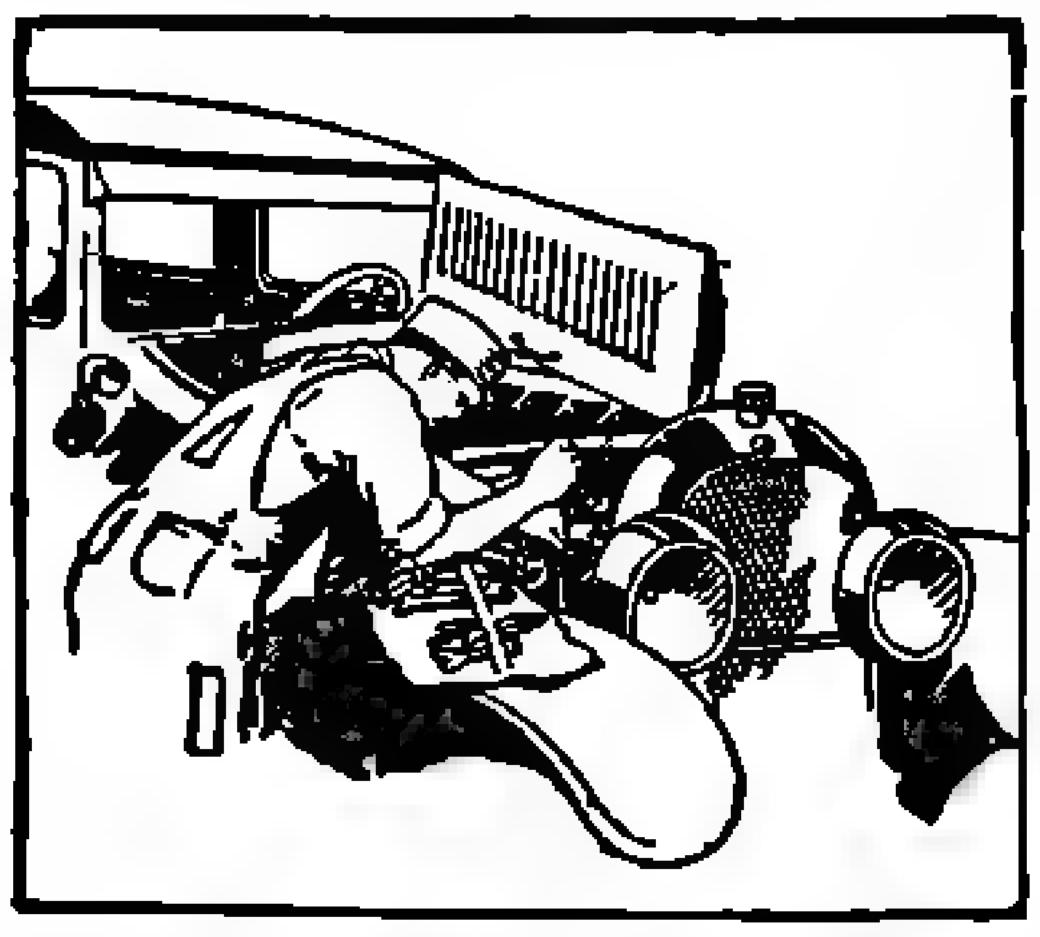

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ANDY'S SHOP MAIL BOX

(Continued from page 14)

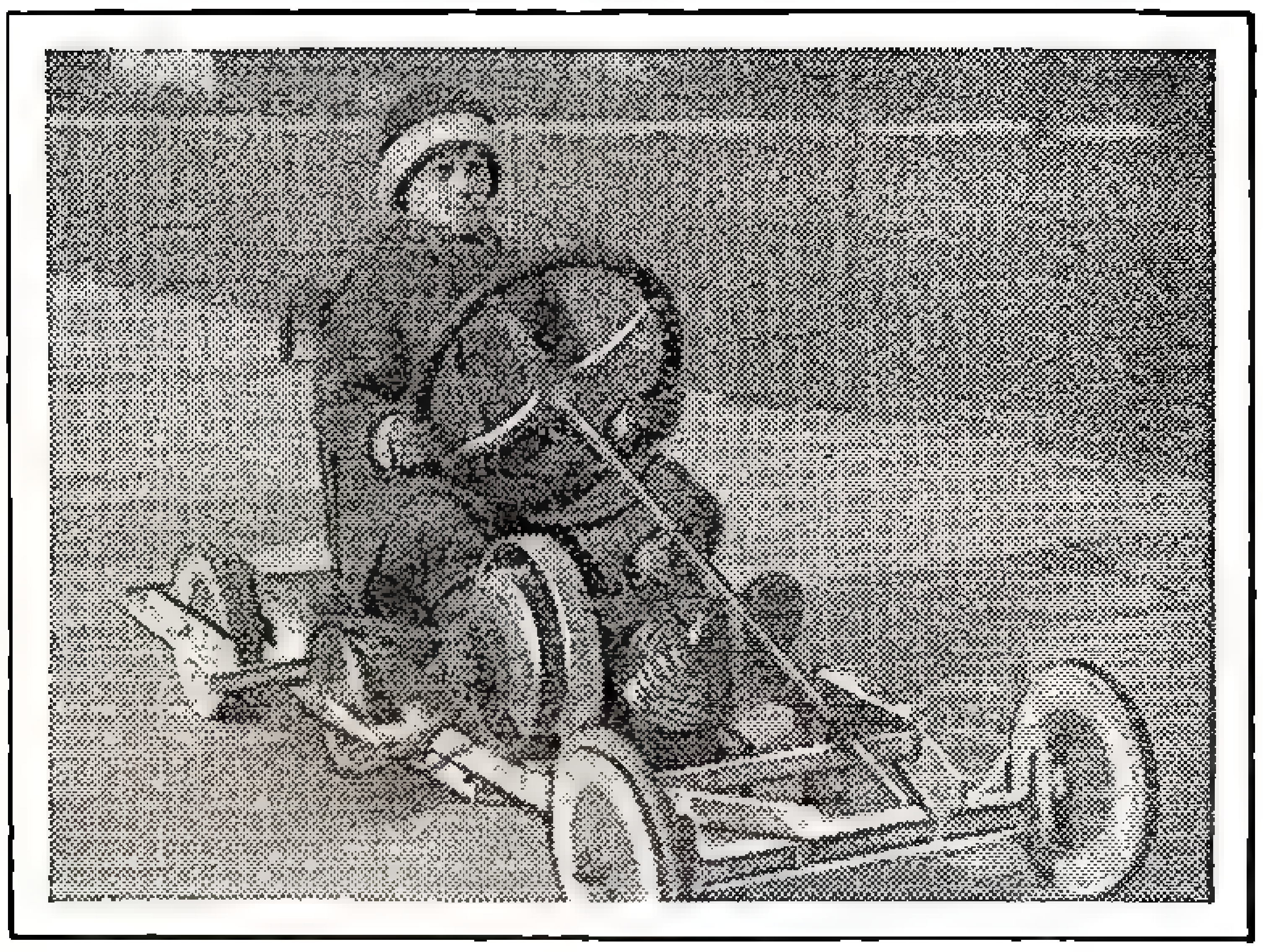
a sort of cuff or shirt tail deal. Here is one such. I don't mind running the letter, but take no responsibility in connection with any such trades effected. If you have stuff like this, and want to get rid of it, maybe I can find room for worthy swap artists. As a sample here's this for a starter. Please don't write me—the address is given in the letter.

Andy's Shop Mail Box,
Andy:

Could you please, tell me where I could obtain a Henderson motor similar to the one shown on a snowsled built by Manville Huttemeier. I'm referring to the March issue. If it's impossible to obtain such a motor, please let me know of one just as good.

Thanking you in advance,

Herbert Wilke,
62 North Ave.
Owego, N. Y.



John Wocheck, of Danbury, Conn., built this pippy little car for his youngster. Nice, eh?

In volume 1, Nos. 3 and 4 of the Packmag, we ran dope on the construction of midget autos. A few of these copies are still available at this office by mail for 35 coppers the book. Much interest was tapped by these articles, and Sam and I have been flooded with pix of home-built cars. One of the most interesting is a picture we get from John Wochek, of Danbury, Conn. John says:

32½ Westville Ave.,
Danbury, Conn.,

Dear Sir:

Have been reading the M. M. since the first issue, but as yet have never dropped in a line to the shop mail box, so this being my first offense you will have to excuse me.

I built this auto for my son out of a washing machine engine and a few scrap parts and it sure is a knockout. Does the boy look happy? I'll say he does. So if you care to publish this in the mail box am sending you two photos of it, or do you need the negatives of it?

Would like to get in touch with Stanley Schmidt of Kansas who had a garden tractor made out of one of these engines. I would

(Continued on page 18)

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NOTE: No other Physical Instructor in the World has ever DARED make such an offer!

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I haven't any use for weight or pulleys that may strain your heart and other vital organs. I don't dose you or doctor you. **Dynamic-Tension** is all I need. It's the natural, tested method for developing real men inside and out. It distributes added pounds of powerful muscles over your body, gets rid of surplus fat, and gives you the vitality, strength and pep that win you the admiration of every woman and the respect of any man.

Charles Atlas

The 97 lb. weakling who became twice holder of the title: "The World's Most Perfectly Developed Man"—won in international contest against ALL strong men willing to compete with him.

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and
Strength

CHARLES ATLAS, Dept. 6-5,
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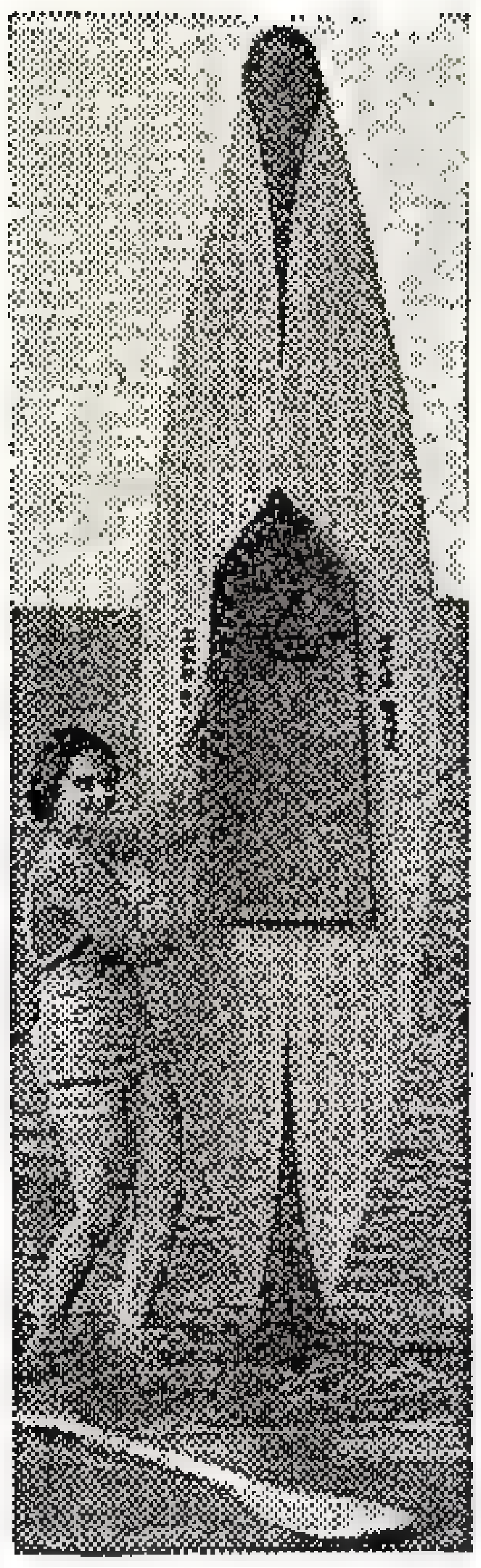

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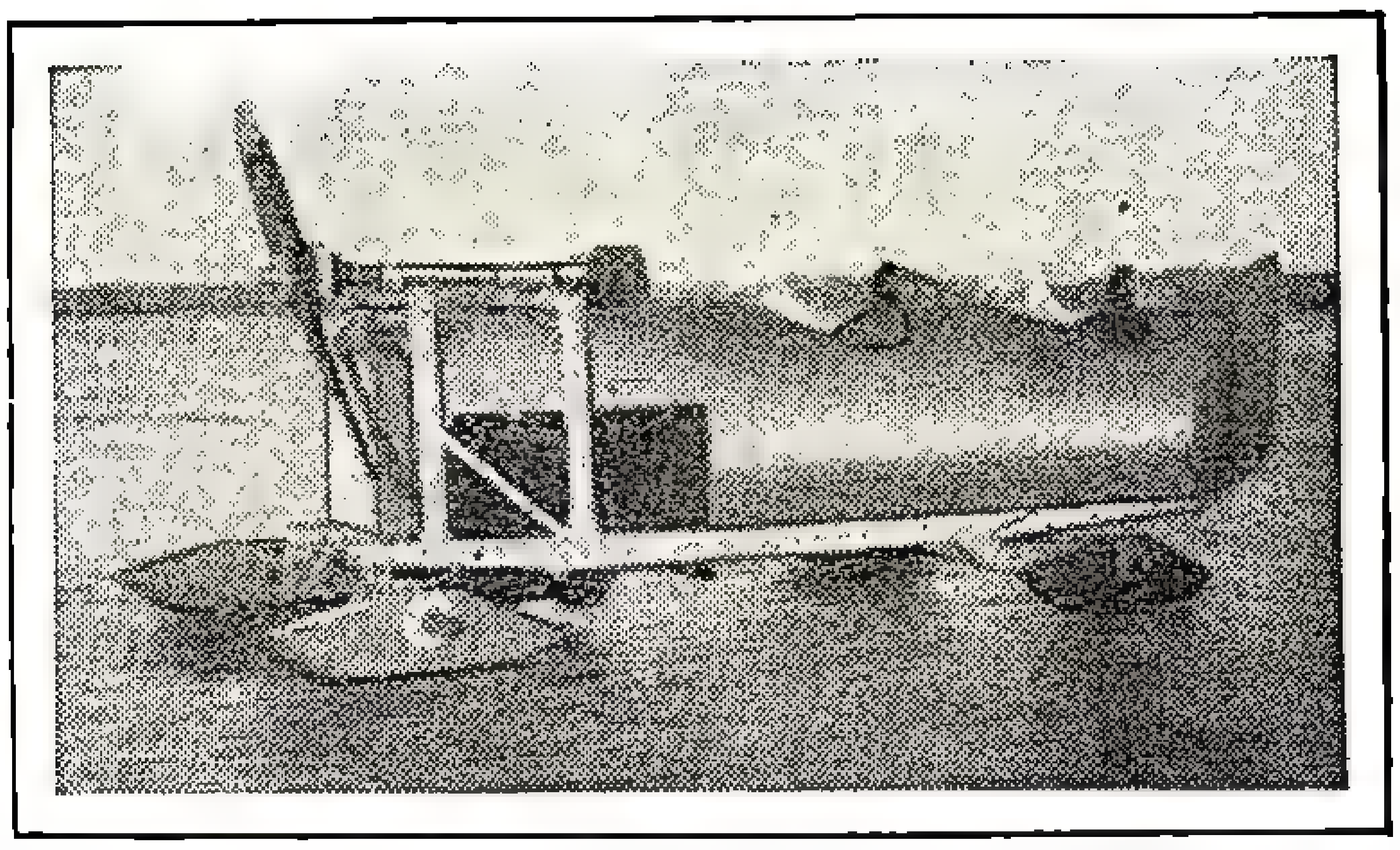
ANDY'S SHOP MAIL BOX

(Continued from page 16)



Donald Schultz's "Arctic Special" which developed a sure cure for headaches.

like to build one too, possibly he could give me a few pointers on the constructing of it. Could you send his address?

If you can use these photos and anyone wishing any information I would gladly supply it.

If you can't use the photos throw them in the waste basket anyway.

Yours until I rig up some other contraption,

John Wochek.

You may be able to see that Wochek's bus has a steel frame, and that the axles and spindle units were hooked from an old model T Ford. Welding them together on the "short side of the ledger," as bookkeepers say, produced a swell-running, if not beautiful, little car for the youngster.

* * *

Whoa, there, Parachute! Git out from under this desk. My corns ain't acorns.

* * *

Be a nice piggie and go away or Papa Andy will connect with whichever end is nearest the toe of my No. 11's. Skaraam!!

* * *

Another ice sled addict comes up in the pouch from Ioway:

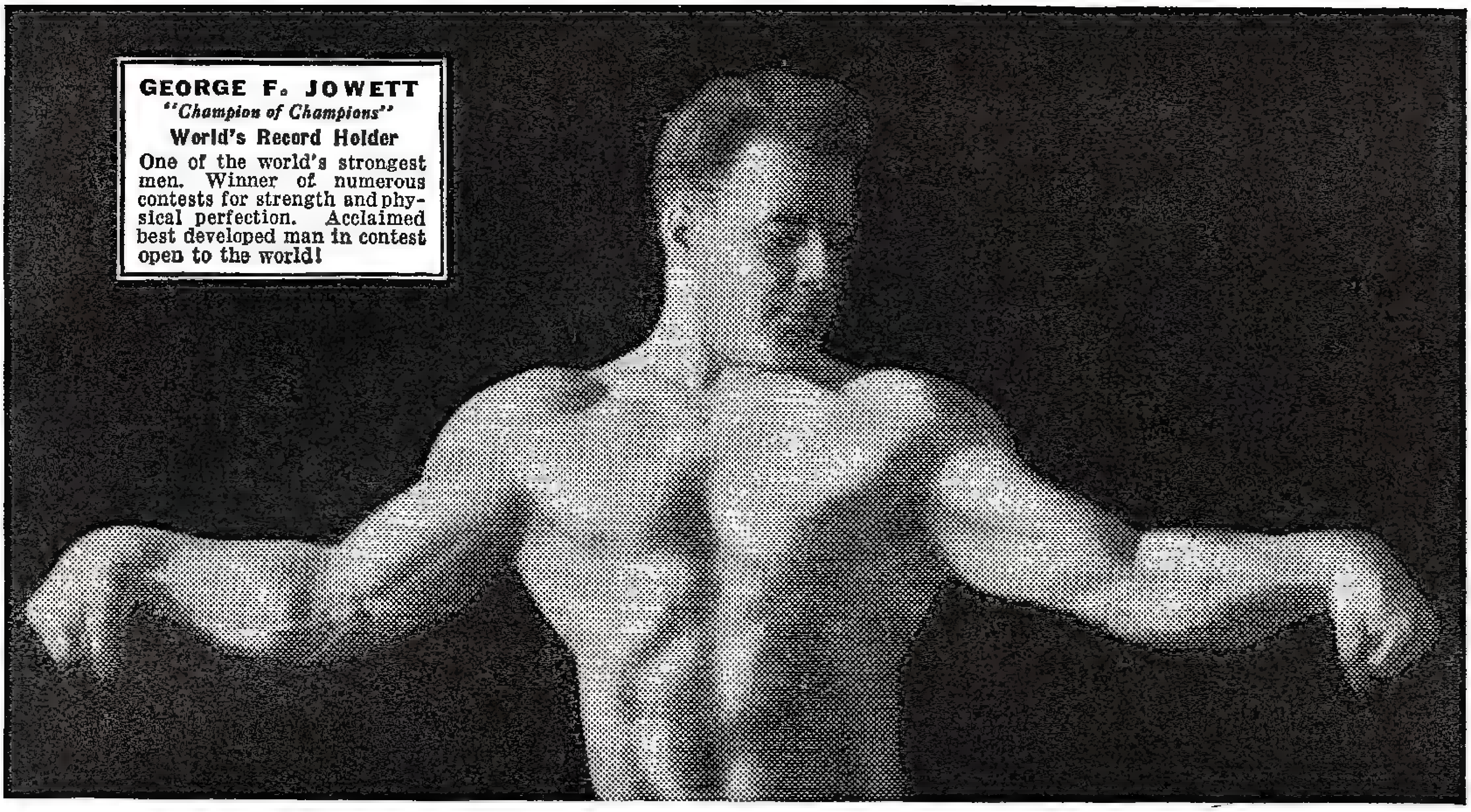
Silver City, Iowa.

Dear Andy:

Have been following your column with interest nigh onto two years absorbing everything but contributing nothing. Am herewith submitting a couple of shots of our version of an ice boat built by my brother and myself during spare time. The craft is powered by a revamped Star four motor swinging a 5' 1' Flotorp prop that was once swung by a Szekely 40. This craft is of practically all Ford and Star parts with a sprinkling of Dodge. Although the motor seems a trifle overloaded the result is speed plus.

Must call your attention to the windshield and headrests. We tested this machine without them and immediately contracted a terrific headache and almost unconsciousness before we got wise to what the trouble was. Equipment of the rear cockpit consists of

(Continued on page 24)



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Don't wait any longer, get going *NOW*—Try one of my test courses first—it will give you the big URGE—

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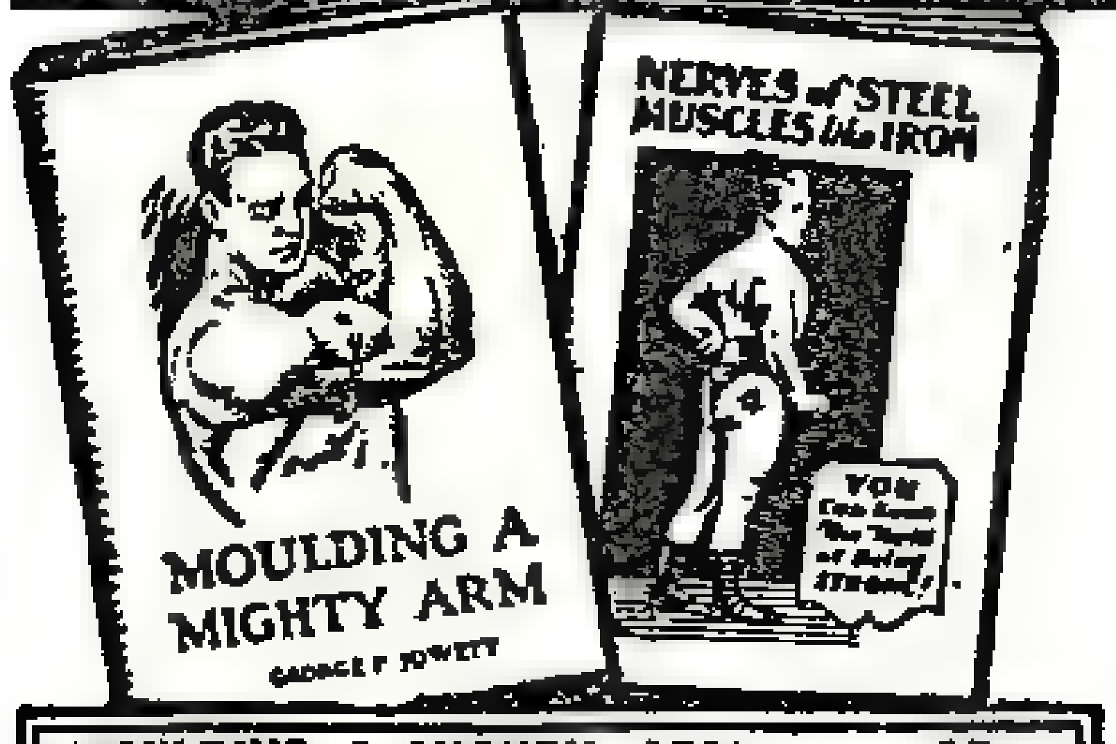
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(Continued on page 22)

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(Continued from page 21)

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STAMPS FREE Canada and Newfoundland bumper packet sent approval applicants who send 5c to cover cost of mailing. Jackson, 1761 6th Ave. E. Owen Sound, Ont., Canada.

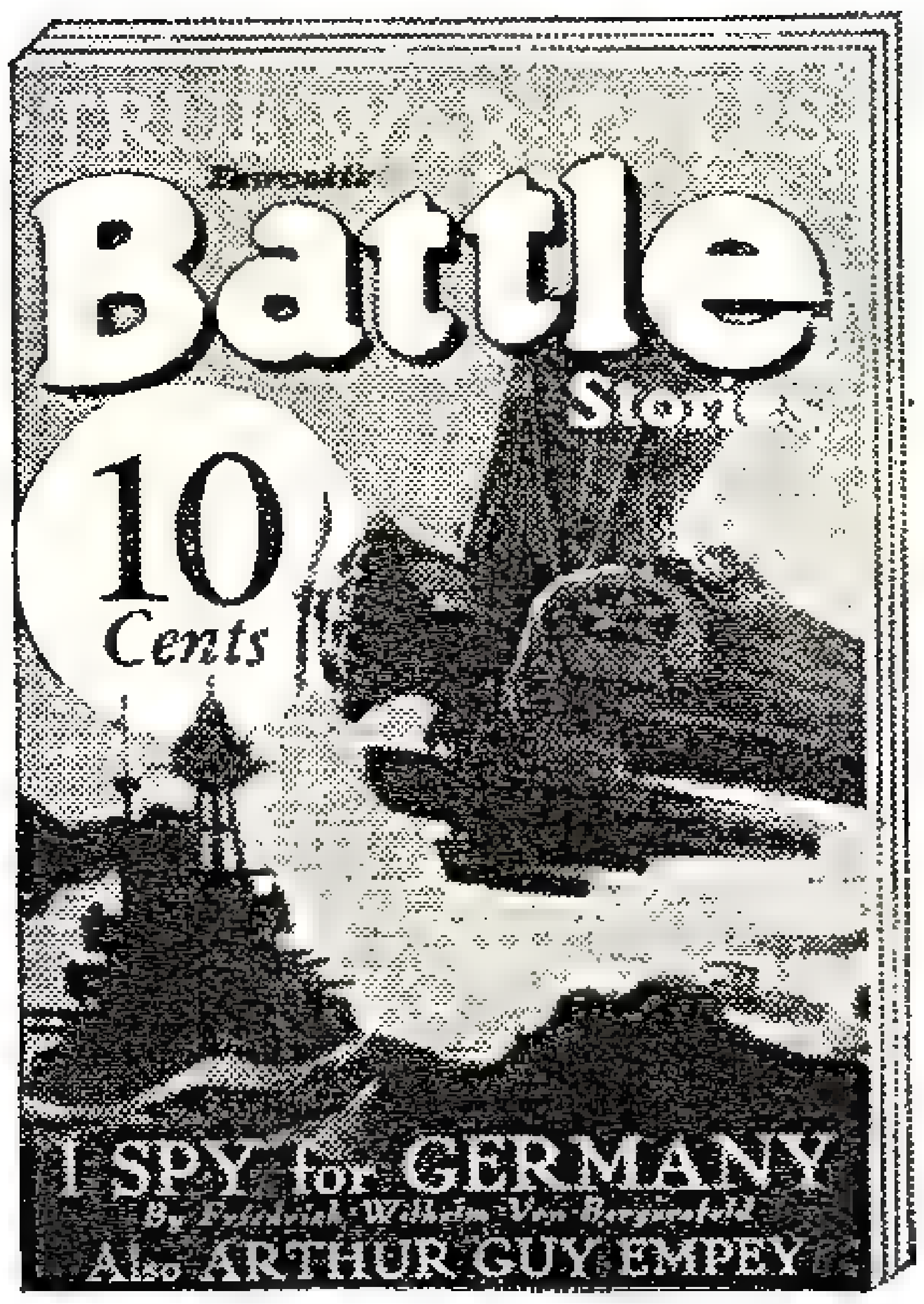
5 SCARCE triangles, Philatelic Magazine, 10c. Albert Gardner, 5220 Cuthbert, Baltimore, Maryland.

UNITED STATES Stamps, $1, $2, and $5, with Tanganyika, North Borneo, etc., for 10c to approval applicants. References. Drisco, 882 M. 57th, Brooklyn, N. Y.

FORTY different United States and United States price list 10c. Seidenberg, Baroda, Mich.

VENTRILOQUISM

LEARN Ventriloquism by mail; small cost, 3c stamp brings particulars. Geo. W. Smith, 125 North Jefferson, Room S-558, Peoria, Ill.



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Thrill to this true story of how Friedrich Wilhelm von Bergersfeld, Operative No. 9 of the German Imperial Secret Service, diced with death in the world war—a remarkable story written in exile.

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A complete novelet based on records and citations of the "Treat 'Em Rough" outfit, a thrilling front line story of fighting Yanks by the world's foremost author of war stories.

BY ARTHUR GUY EMPEY

Thrilling True War Stories

A complete magazine of true war tales. There are hours of thrills with heroic fighters on land and sea and in the skies in this great issue of a great magazine written by decorated fighters of various nations.

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BATTLE
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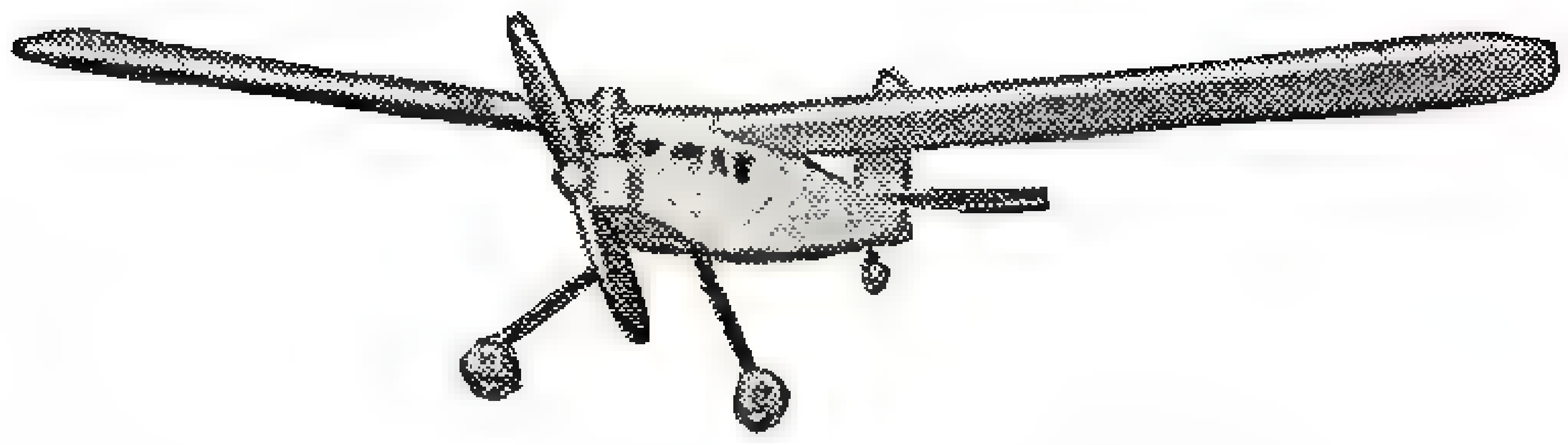
Now On Sale!
10 CENTS

If your news dealer is sold out, send 10c in stamps or coin to BATTLE STORIES magazine, 529 S. 7th Street, Minneapolis, Minn., and a copy of the current issue will be mailed to your address.

Gasoline Driven Models



CARLSON ALBATROSS

6' 4" Span — 3' 6" Length — Total weight 2.5 lbs.

The Carlson "Albatross" is the only ship of its kind on the market, it really FLIES using a Knight one cylinder gasoline motor. Full description given in circular.

RUBBER DRIVEN MODELS

C. G. ATTACK

CARLSON GULL ATTACK

17" Span, 13½" overall, double surface wing, bent bamboo parts. Modern design has made the performance of this gull-wing attack the sensation of the model world. We invite you to compare its price, unique design, and dazzling flying ability with anything on the market. All bamboo and wire parts are bent; ribs and bulkheads are printed on balsa. All other material necessary, including plans, colored paper, cement and dope are furnished in kit.

This model has everything—it's the finest of them all. Priced very low, only 75c postpaid in U. S.

FREE Plans for Laird Super Solution with every folder. SEND 10c for illustrated folder giving prices for all Gasoline and Rubber powered models.

CARLSON MODEL AIRPLANE CO., Dept. K-3
134 S. CLINTON ST., CHICAGO, ILL.

For Knight-gasoline motors to power the "Albatross" see Power Model Boat and Airplane Co. ad on page 136.

The 1933
FLYING MANUAL
is now ready for YOU!

●

Crammed with plans for light monoplanes, seaplanes, aviation motors and countless other items of vital interest to the light airplane enthusiast. Here's a sample of some of the high spots in the Edition:

PIETENPOL SKY SCOUT—Plans for this one-place monoplane powered by Model T Ford motor.

CORBEN CABIN MONOPLANE—Also shown as open cockpit job. Cabin plane costs only $220 for materials, less motor!

HICKMAN BABY SEAPLANE—A one-place twin-pontoon biplane seaplane.

GERE BIPLANE—Neat ship for Ford or Chevrolet power plant, resembling an army pursuit job—and many others.

PRICE 50 CENTS

If your news dealer cannot supply you, send 50 cents to Fawcett Publications, Inc., 529 S. Seventh St., Minneapolis, Minn., and a copy of the 1933 Flying Manual will be mailed to you at once.

MEN! WOMEN
How would you like to Make
up to
$200
WEEKLY

REVOLUTIONARY NEW, LOW-COST LIFE PROTECTION

All your life you've longed for an opportunity such as this—an opportunity for you to have greater Prosperity!

$5 PROFIT FROM EVERY $6 ORDER
UP TO $25—$40 DAILY, EASY

The wonderful feature of National Aid Society's Plan is the steady, ever pyramiding income that awaits you. A cash-in-advance profit beckons from every door—actually $5.00 profit on every $6.00 order!
You do not spend a penny for your selling equipment which you can easily carry in your pocket. It's furnished you entirely FREE. Write just one $6.00 order and pocket a Five Dollar profit for it then and there! No waiting for deliveries, no future collections, no C. O. D.'s to be returned.

MAKE 4 AND 5 SALES EVERY CALL

National Aid Society Plan appeals to every member of every family, and the good news spreads from neighbor to neighbor. You can often actually pocket $10 to $15 at a single call!

A NEW ADVANCED FORM OF PROTECTION

The NATIONAL AID SOCIETY is not an Insurance Company. It is organized under the laws of Indiana, not for profit. Its purpose is to provide protection for all who otherwise could not elsewhere secure such protection excepting only at prohibitive costs. It offers Safe, Sure, LIFE AND PROPERTY PROTECTION MERELY AT COST.

YOUR FIELD UNLIMITED

No Medical Examination! Practically No Age Limit! You can sell two memberships to any one Person, thereby doubling these benefits—and doubling your profits as well.

THIS COUPON BRINGS YOUR FREE STARTING OUTFIT

Begin Making Money Same Hour You Hear From Us!

Mail Coupon Now and we'll send you, ENTIRELY FREE everything you need to start. Within ten minutes after opening our letter, you can START COLLECTING FIVE DOLLAR BILLS! Write your address below—and mail the coupon NOW.

National Aid Society
Dept. 953 Springfield, Illinois

RUSH THIS COUPON TODAY

NATIONAL AID SOCIETY, Dept. 953, Springfield, Illinois
Rush me Free Complete Starting Outfit, full details of your Profit-Sharing Plan and Big Money Making proposition.

Name ....
Address ....
City .... State............

ANDY'S SHOP MAIL BOX

(Continued from page 18)

steering wheel, spark and gas controls, self starting switch, ammeter, brakes, etc.

Although this (Arctic Special) cost approximately $35 we got that much kick out of building it. However, the real thrill comes in the driving. It handles like a homesick Cadillac.

Sincerely,
Donald Schultz.

Now ain't that something? I am glad to see that comfort has been thought of by our Donnie boy. I am now wondering whether he needs springs on the bus or not. I have had many an afternoon's fun with this kind of breeze buster, and really the ice gets quite rough, although it looks smooth. I didn't know what the headaches came from, but am glad to know that it was wind. I thought it was rough ice and still think that no design for one of these contraptions is finished until springs are allowed for. An afternoon's ride is provocative of quite a pain in the piazza.

* * *

Now comes old Dad Storms again, that indefatigable Nawth Ca'lina flying pioneer. Read what:

88 Charlotte St.,
Asheville, N. C.

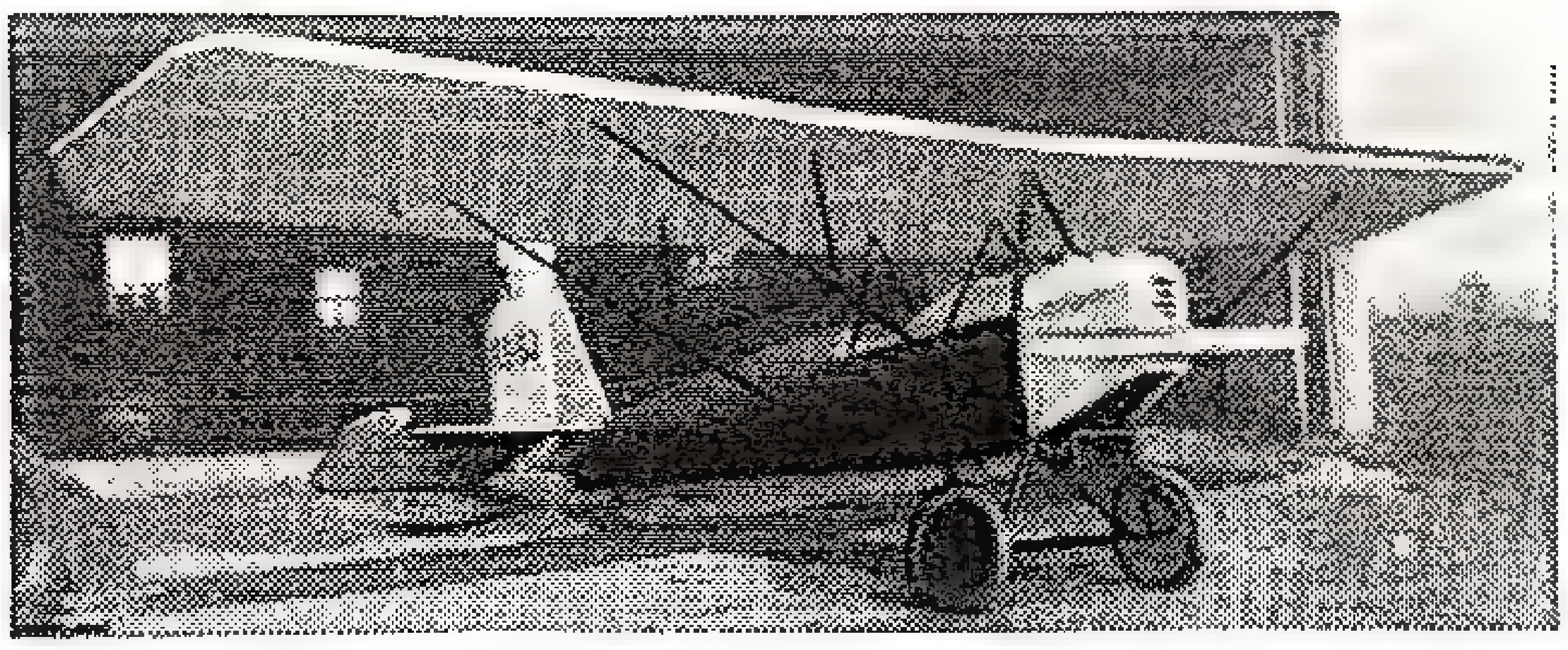
Gentlemen:

Here are two snapshots of "The Bug," a Model A Ford-powered flivver built by J. E. Kennedy and Claude Beamgard of Clover, S. C. The little ship is strongly built, weighs about 700 pounds and is a fine performer with the Model A motor.

Both of these boys have taught themselves to fly it by taxiing it on the Spartanburg Airport until they could handle it on the ground almost as well as an automobile. This practice was followed by short hops a foot or two above the ground until they could land more or less smoothly. They now make excellent take-offs and landings and handle the ship well in the air.

The plane lands at 25 m.p.h., has a high speed of about 75 miles, and cruises at 65 m.p.h. If either of the photos is clear enough to print please use one or both in an early issue.

Yours very truly,
N. E. Storms.



Here's a ship snapshot which is sent by N. E. Storms, of Asheville, N. Ca'lina. A Ford "A" job with nice characteristics, aloft or afield.

(Continued on page 28)

They dared Officer Kane to play

..and his music held them spellbound

ETHEL'S house party was at its height—when suddenly there came an ominous knocking at the door. Ethel ran to open it—there stood Police Officer Kane.

"I want to see the man of the house," thundered Kane.

"I'm sorry," stammered Ethel nervously, "but my father is not at home."

"Well, what's goin' on in here anyway?" continued the officer sternly. "Every one on the block is complainin' of the noise. I've a good mind to arrest the lot of you."

Ethel was mortified—what a disgrace!

"Oh please," pleaded Ethel, "please don't do anything like that."

Then Kane burst out laughing.

"Don't worry, lassie—you were all havin' such a fine time I couldn't help droppin' in," he explained.

"Oh," sighed Ethel, "how you frightened me. Won't you join us?"

Kane Joins the Party

"Ha," laughed Kane, as the Victrola started again, "why must you play that canned music—can't any of you play this beautiful piano? Sure, I'd like to give you a tune myself."

"I dare you to play for us," shouted Ted Strong.

"I'm afraid I'll have to be goin'," stammered Kane, embarrassed.

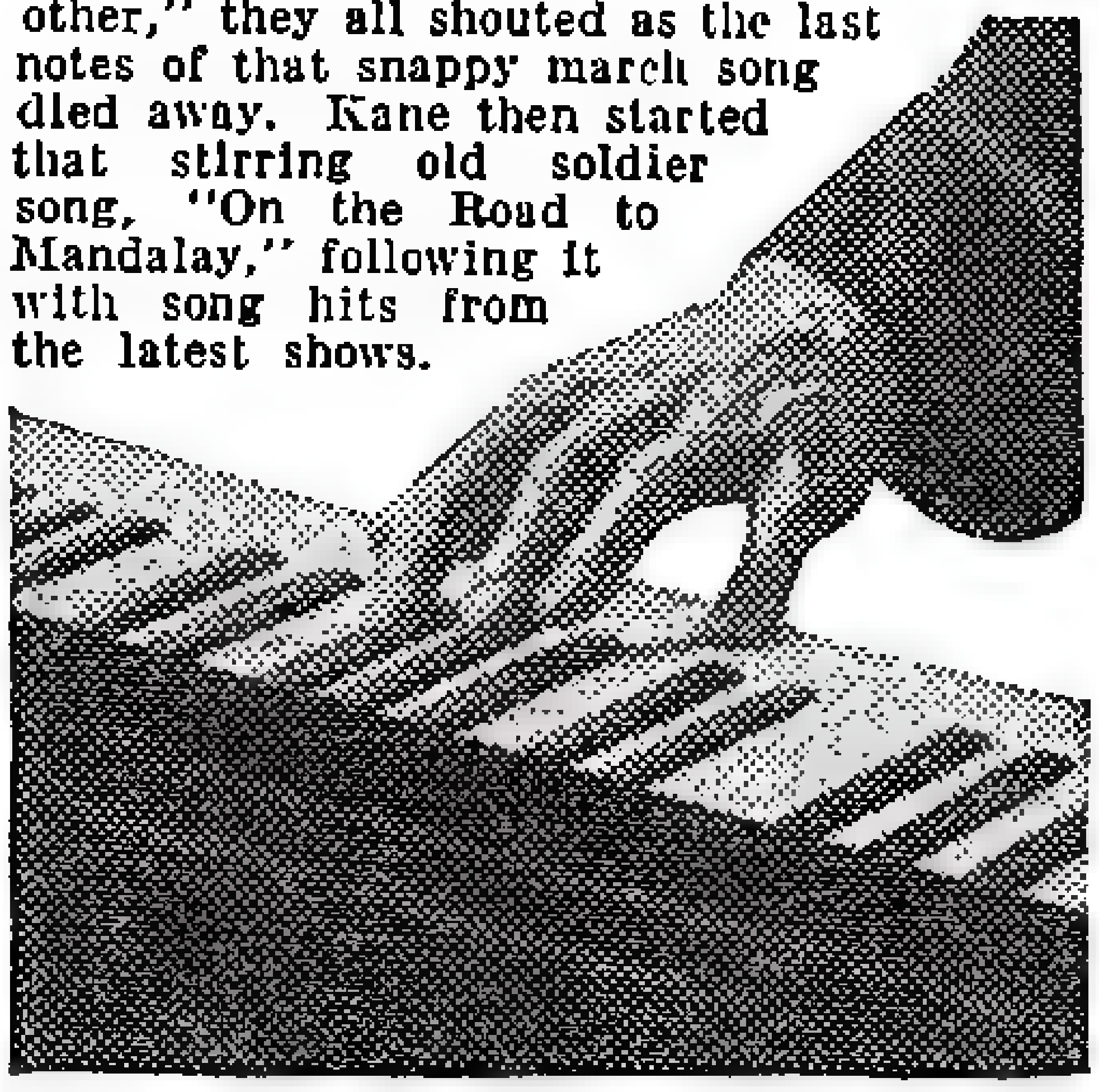
"Mr. Kane, I think you might play for me after the fright you gave me," smiled Ethel.

"Well, b'gorry, maybe I will," agreed the officer. And as he sat down at the piano everyone laughed. But the noise stopped when he struck the first rollicking notes of the famous "Song of the Vagabonds."

PICK YOUR INSTRUMENT

- Piano
- Organ
- Ukulele
- Cornet
- Trombone
- Piccolo
- Guitar
- Violin
- Clarinet
- Flute
- Saxophone
- Harp
- Mandolin
- 'Cello
- Hawaiian Steel Guitar
- Sight Singing
- Piano Accordion
- Voice Speech Culture
- Harmony and Composition
- Drums and Traps
- Automatic Finger Control
- Banjo (Plectrum, 5-String or Tenor)
- Juniors' Piano Course

"More—more," "That's great—play another," they all shouted as the last notes of that snappy march song died away. Kane then started that stirring old soldier song, "On the Road to Mandalay," following it with song hits from the latest shows.



"Well," he laughed, as they finally let him get up from the piano, "I'll have to be on my way now."

"Thank you for your lovely music," said Ethel. "You must be playing a good many years?"

"Sure, and I haven't been playin' long at all." Then the questions came thick and fast. "How did you ever learn so quickly?" "When do you find time to practice?" "Who was your teacher?"

Kane Tells His Story

"Well, to tell you the truth I had no teacher. I've always loved music, but I couldn't take regular lessons on account of my duties as a policeman. Then one evening, I saw a U. S. School of Music advertisement, tellin' of a new way of learnin' to play. I didn't believe it myself, but I sent for their Free Demonstration Lesson that showed me how easy it was, so I wrote for the whole course.

"There were no tiresome scales or tedious exercises. I played real pieces almost from the start. Now I'm playin' classical numbers or jazz, havin' the time of my life."

* * *

This is not the story of just one isolated case. Over 600,000 people have learned to play by this simple method. You can, too. Even if you don't know one note from another you'll grasp it in no time. First, it *tells* you how to do a thing—then it *shows* you how in pictures—then you do it yourself and *hear* it.

You teach yourself—right at home—without any uninteresting finger exercises, tedious scales of other humdrum methods.

Free Booklet and Demonstration Lesson

To prove how practical this course is, the U. S. School of Music has arranged a typical demonstration lesson and explanatory booklet which you may have Free. They show how anyone can learn to play his favorite instrument by note in less than half the time and at a fraction of the cost of old slow methods. The Booklet will also tell you all about the amazing new *Automatic Finger Control*.

Don't delay—act at once—fill in and mail the coupon below today—no obligation whatever.

(Instrument supplied if desired, cash or credit.) U. S. School of Music, 2625 Brunswick Bldg., New York City.

U. S. SCHOOL OF MUSIC
2625 Brunswick Bldg., New York City

Please send me your free book, "How You Can Master Music in Your Own Home," with inspiring message by Dr. Frank Crane, Free Demonstration Lesson and particulars of your easy payment plan. I am interested in the following course:

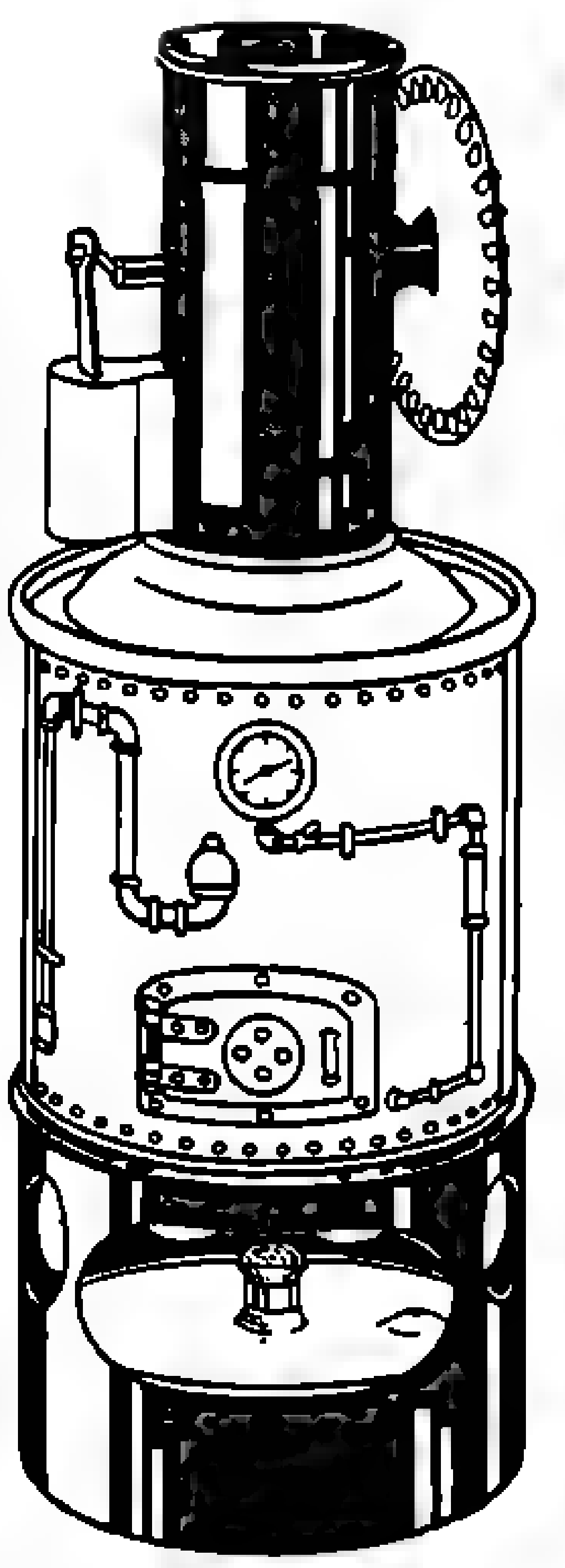
.... Have You Instrument? ....

Name ....

Address ....

City.................... State............

THIS GREAT BIG STEAM ENGINE



25c POWERFUL NEW MODEL JUST OUT

Add 10c for postage and packing

The world's biggest value in mechanical toys. A great big steam engine, measuring 7 inches in height by 2½ inches in diameter (7½ inches in circumference) for **ONLY 25 cents.** You should see it run, too. It's a revelation to see the fly wheel spin around at a great rate as soon as you "get steam up". Just fill the boiler with water, light up, and in a few minutes the engine is running at top speed. New model—just out—runs on alcohol or canned heat, has fly wheel for running small mechanical toys.

FULLY TESTED—GUARANTEED TO RUN

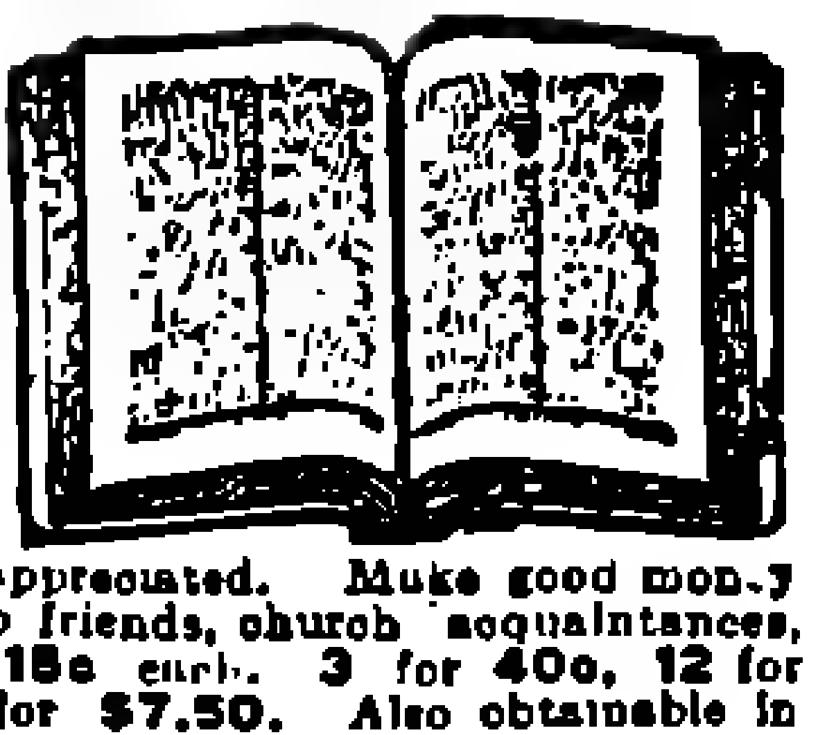
It is foolproof, harmless, fully tested and guaranteed to run. A scientific toy that illustrates the principle of the steam turbine. Runs for hours on one filling of water. Every boy should have one. Wonderfully well made—splendid value for the money. Sells for **ONLY 25c,** with **10c** extra for postage and packing. Well worth double.

MAMMOTH NOVELTY CATALOG 10c

Add 10c more if you want our gigantic catalog, nearly 800 pages of electric and other novelties, puzzles, tricks, jokes, etc. You never saw a book like it before. Only catalog of its kind in existence.

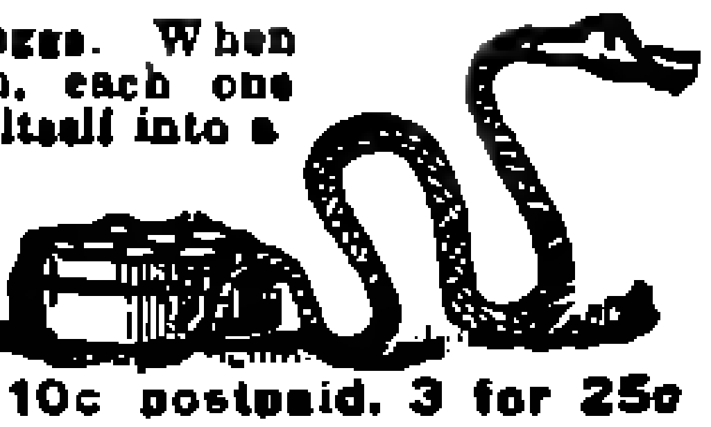
JOHNSON SMITH & CO. Dept. 919 RACINE, WIS.

MIDGET BIBLE



GREAT CURIOSITY Smallest Bible in the World. Size of a postage stamp. 200 Pages. Said to bring good luck to the owner. A genuine work of art. Must be seen to be appreciated. Make good money selling them to friends, church acquaintances, etc. PRICE 15c each. 3 for 40c, 12 for $1.35, 100 for $7.50. Also obtainable in Leather Binding, with gold edges. Price 50c each, 3 for $1.25, $4.50 per doz. Magnifying Glass for use with Midget Bible 15c

SERPENT'S EGGS

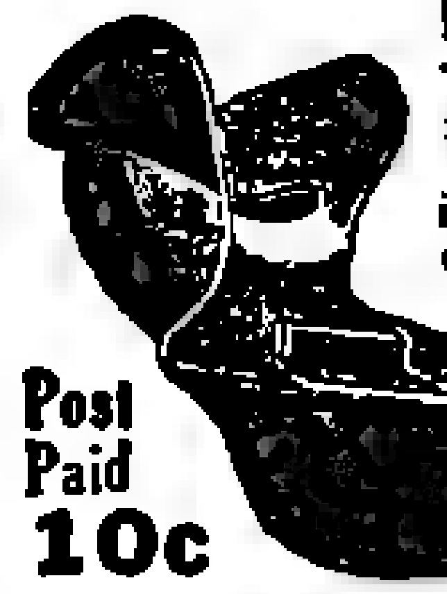


Box contains 12 eggs. When lit with a match, each one gradually hatches itself into a snake several feet long, which curls and twists about in a most life-like manner. **Price per box. 10c postpaid. 3 for 25c**

STAGE MONEY

With a bunch of these bills, it is easy for each person of limited means to appear prosperous by flashing a roll of these bills at the proper time and peeling off a genuine bill or two from the outside of the roll, the effect created will be found to be all that can be desired. **Prices, postpaid: 40 Bills 20c, 120 for 50c, or $3.50 thousand postpaid.**

NOSE FLUTE

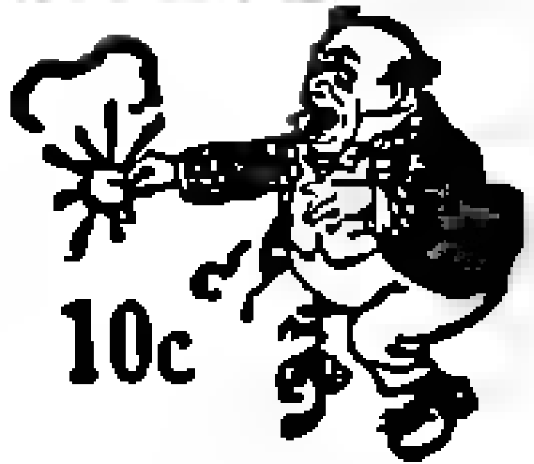


Post Paid **10c**

The Magic Nose Flute, or Humanatone, is a unique and novel musical instrument that is played with nose and mouth combined. There is just a little knack in playing it which, when once acquired after a little practice, will enable you to produce very sweet music that somewhat resembles a flute. There is no fingering, and once you have mastered it you can play all kinds of music with facility and ease.

JOHNSON SMITH & CO.

SURPRISE MATCHES



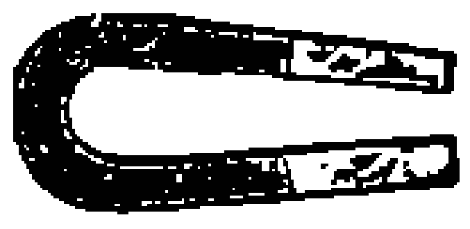
More fun than fighting with your wife. Look just like ordinary matches. As the victim tries to light one he gets quite a surprise. **10c**

Price 10c per box, 3 boxes for 25c, 12 for 75 cents.

STAR TOY MAKER

Greatest boys' book written. Tells how to make a Pinhole Camera, a Canoe, model Railroad, a Telephone, Boomerang, Telegraph Instrument, Box Kite, Talking Machine, Microscope, Electric Motor, Electric Door Bell, Water Wheel, Paddle Raft, a pair of Skis, a Dog Sled, Bird House, Rabbit Yard, etc. 64 pages. 150 illustrations. **PRICE 10c.**

BOY'S OWN TOYMAKER. A new book. Tells how to make chemical toys, electrical toys, galvanic toys, mechanical toys, paper toys, cardboard toys, boats, traps, etc. 200 illustrations. **Price 25c postpaid.**



FUN WITH MAGNETISM. 50 novel and unique experiments in **MAGNETISM** that you can perform with the aid of an ordinary magnet: magnetic chain, fleeing and spinning needle, nail and ball cluster, magnetic fish, top, motor, magnetic billiard balls, many other stunts. Also interesting information about lodestone, magnetism, electricity, etc. **PRICE 10c p.pd.**

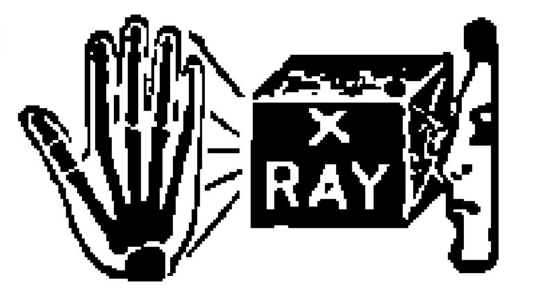
BOOK ON BOATS. How to build rowing, sailing boats. Everything pertaining to boats explained in plain terms so anyone can understand. Illustrated. **10c p.pd.**

5-MINUTE HARMONICA COURSE. A new easy self-teaching method. Teaches how to play, to use the tongue, tremolo, fully illustrated. **Price 15c postpaid.**

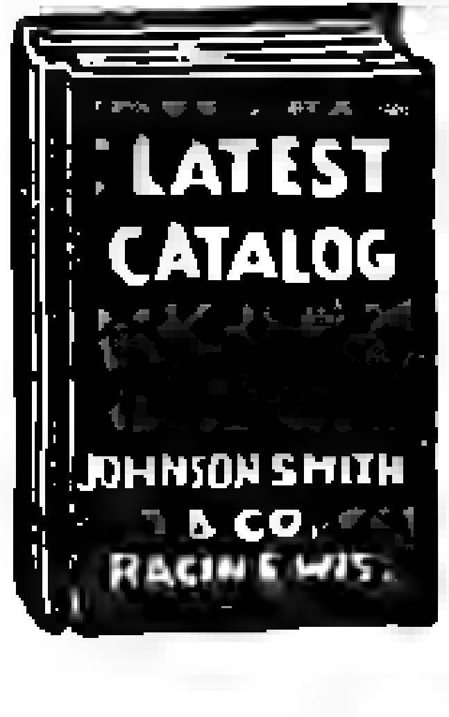
MONEY MAKING SECRETS. Golden opportunities for everyone. 64 page copyrighted book chock full of money-making ideas, recipes, formulas, wrinkles, trade secrets, etc. Businesses that can be started with little or no capital at home in spare time. **10c postpaid.**

TRICKS & SOCIAL ENTERTAINER. Contains hundreds of simple tricks, illusions, diversions that anyone can do. Also explains secret of second sight. **Price 25c postpaid.**

WONDERFUL X-RAY TUBE



A wonderful little instrument producing optical illusions both surprising and startling. With it you can see what is apparently the bones of your fingers, the lead in a lead pencil, the interior opening in a pipe stem, and many other similar illusions. **Price 10c, 3 for 25c.**



LATEST CATALOG
JOHNSON SMITH & CO.
RACINE WIS.

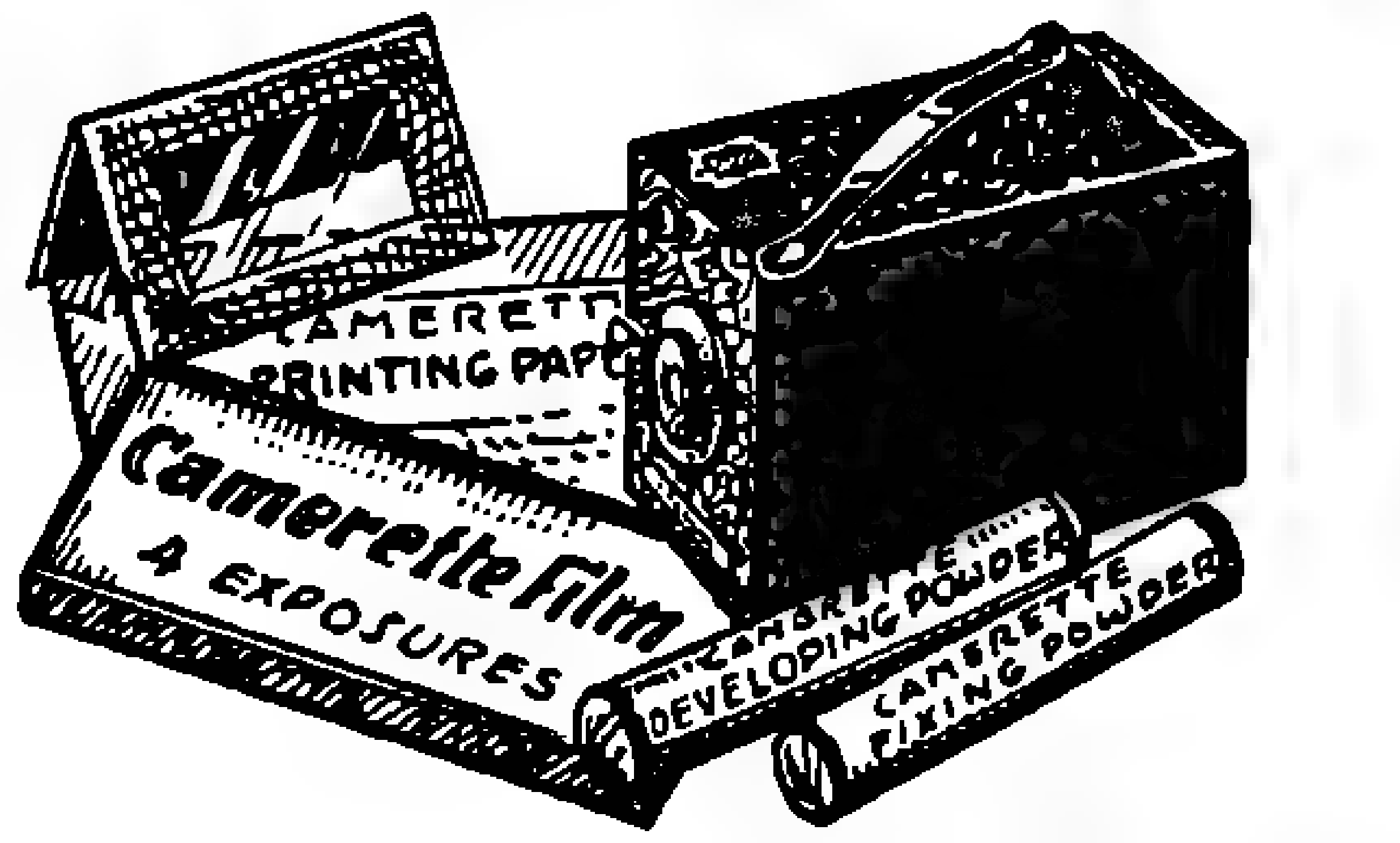
JOHNSON SMITH & CO.

Dept. 919 RACINE, WIS.

A copy of our NEW CATALOG mailed on receipt of 10c, or the De-Luxe Edition with cloth binding 25c. Bigger and better than ever. Only book of its kind in existence. Nearly 800 pages of all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps, for all articles listed above. Canadian money, stamps and Postal Notes accepted if 20 per cent added for Exchange.

CAMERA AND COMPLETE OUTFIT 35c

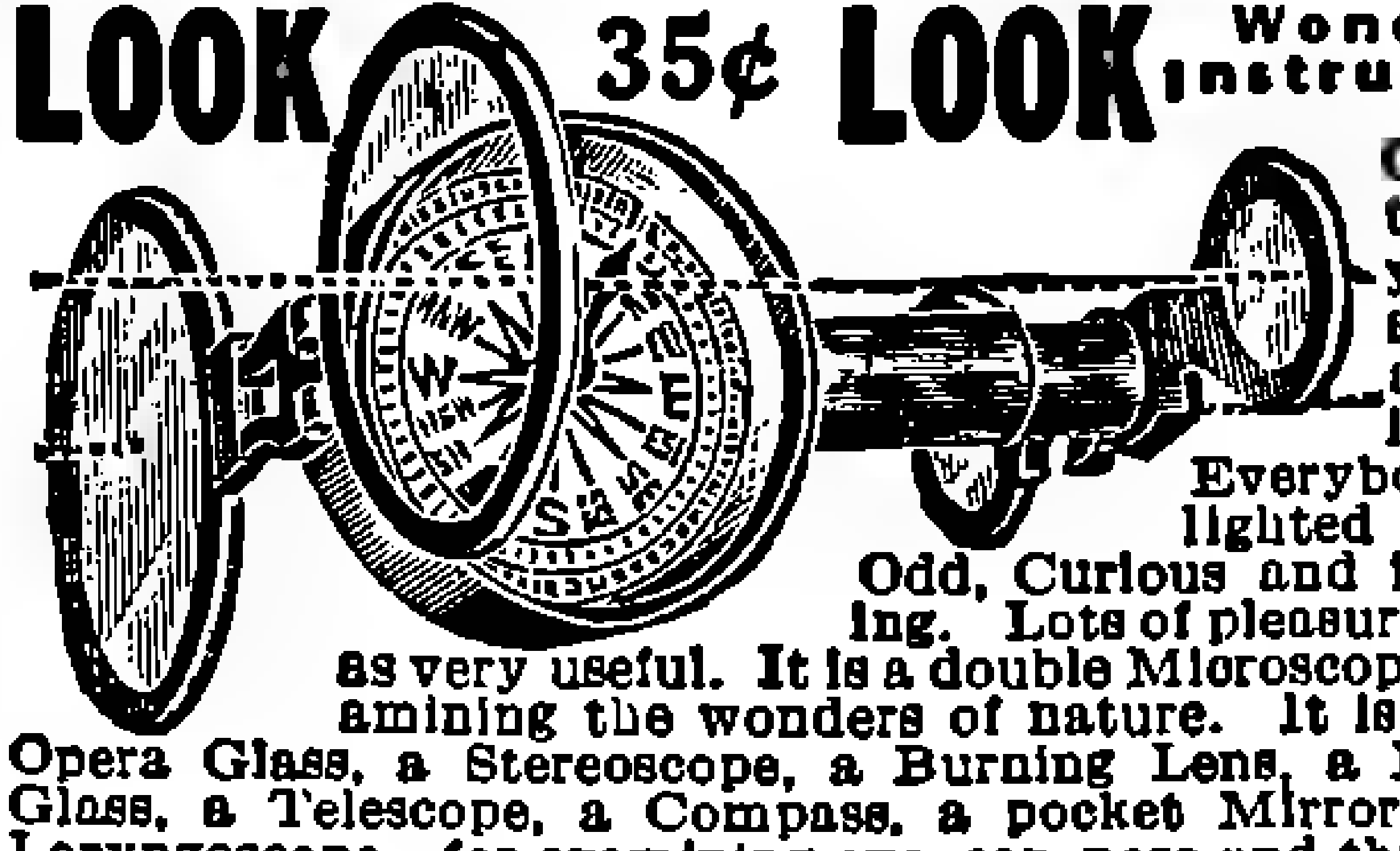
[Add 10c for Postage and Packing]



Although this apparatus is so **MARVELOUSLY CHEAP,** it is quite efficient, and will take **SPLENDID PICTURES.** Just the thing for beginners in photography. It takes pictures not quite 2x1¼ inches with clearness, sharpness and distinctness. Loads in daylight. Has a **VERY GOOD LENS; BRILLIANT VIEW FINDER,** a simple yet effective **SHUTTER,** time and instantaneous, leatherette handle. Comes complete with **4 FILMS,** 1 package of **PRINTING PAPER,** a neat little **PRINTING FRAME** with glass top, and a **SUPPLY OF CHEMICALS** for developing, fixing and turning out the finished picture. Full printed instructions so plainly written that a child cannot fail to understand. Never before has such an inexpensive opportunity been offered of indulging in the fascinating art of photography. With this outfit you can take portraits of your friends, views of places of interest you may visit, and snapshots of curious events and quaint characters. The **CAMERA AND COMPLETE OUTFIT FOR ONLY 35c** (Canada and foreign 50c) with **10c extra for postage and packing. EXTRA FILM 10c per package of 5 Films. EXTRA PRINTING PAPER 10c per package.** JOHNSON SMITH & CO., Dept. 919, RACINE, WIS.

LOOK 35¢ LOOK

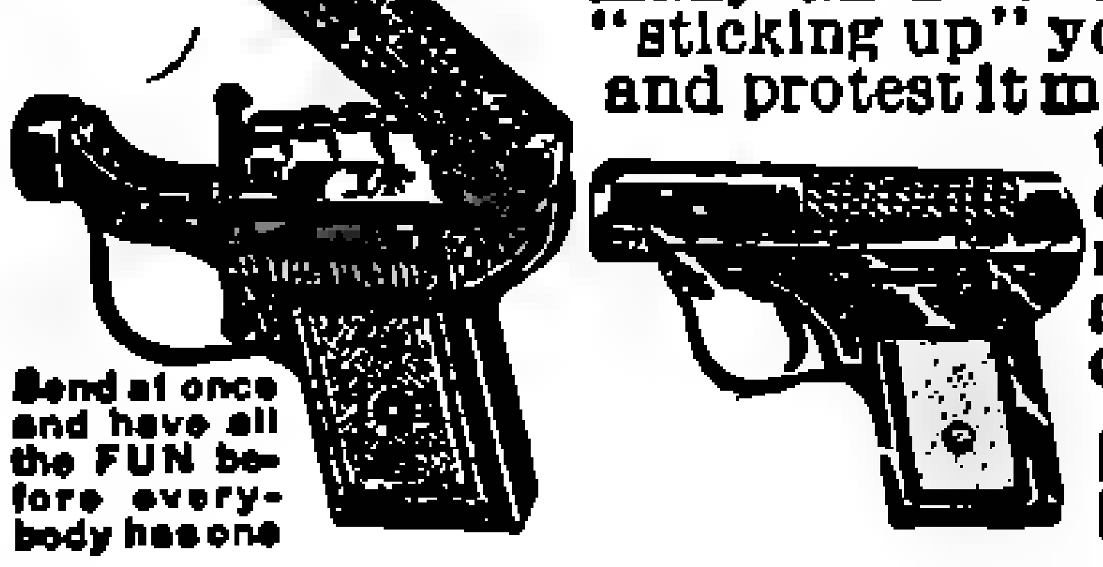
Wonderful instrument.



Greatest thing yet. Nine separate articles in one. Everybody delighted with it. Odd, Curious and Interesting. Lots of pleasure as well as very useful. It is a double Microscope for examining the wonders of nature. It is also an Opera Glass, a Stereoscope, a Burning Lens, a Reading Glass, a Telescope, a Compass, a pocket Mirror, and a Laryngoscope—for examining eye, ear, nose and throat. It is worth all the cost to locate even one painful cinder in the eye. Folds flat and fits the pocket. Something great—you need one. **Don't miss it. Sent by mail. Only 35c or 3 for $1.00.**

PISTOL CIGARETTE CASE

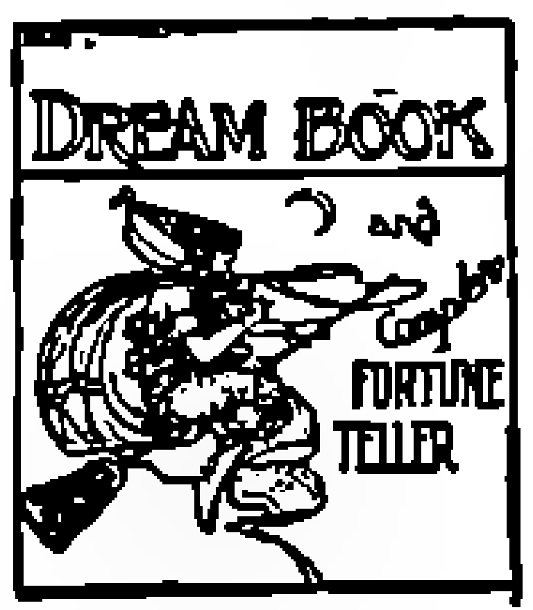
It looks like a deadly weapon, but it is merely a novel Cigarette Case. This clever contrivance has proved itself better than the real thing in many an awkward encounter. Great fun "sticking up" your friends. They squirm and protest it might be loaded. Pull the trigger and the slide flies open disclosing the cigarettes. Well made, light and compact. Weight only 2 ounces.



Send at once and have all the FUN before everybody has one

PRICE POSTPAID 35c

Tell Your Own Fortune



With the aid of this dream book and fortune-teller. The key to your future. Will you be lucky in love? Successful in business? Will you be wealthy? Complete with dictionary of dreams with descriptions and correct interpretations, with lucky numbers, fortunate days, oracles, divination, palmistry, etc. Also tells how to tell fortunes by various methods, by grounds of coffee or tea, by dominoes, by marks, scars or moles, miscellaneous games with cards, lucky days, weeks, months, years; how to receive oracles by dreams, finger nail observations, etc. **PRICE 10c**

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This 64-page book tells how. Explains all about Hypnotism, how to hypnotize, how to produce sleep, how to awaken a subject, how to hypnotize animals, hypnotism in diseases, hypnotism for scientific practice, illusions and halucinations, personal magnetism, thought transference, etc. Written in plain, everyday language that anybody can understand. **PRICE 10c postpaid.**

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64-page book tells how. Gives the meaning of each and every card, how to deal and lay them out. Everything explained in simple language. **PRICE 10c postpaid.** *770 page catalog 10c.*

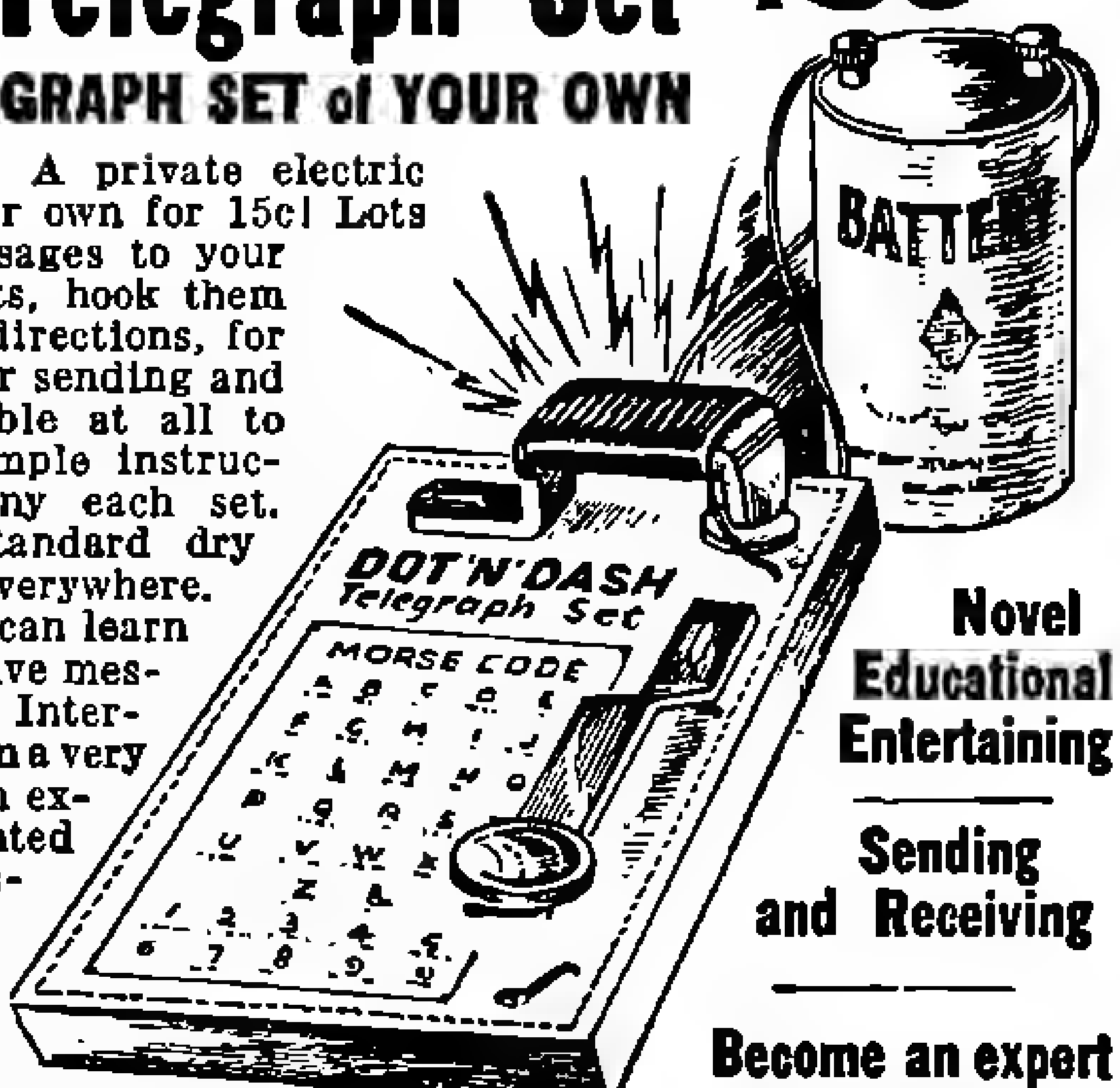
Address orders for all goods on above and on following page to Johnson Smith & Co., Dept. 919, Racine, Wis.

Electric Telegraph Set 15c

A PRIVATE TELEGRAPH SET of YOUR OWN

Here you are boys! A private electric telegraph set of your own for 15c! Lots of fun sending messages to your friends. Get two sets, hook them up as shown in the directions, for two-way messages for sending and receiving. No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 8 inches, first class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in a neat box with full illustrated instructions—ALL FOR 15c (without battery) postpaid. Canada & Foreign 20c.

JOHNSON SMITH & CO. Dept. 919 RACINE, WIS.



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DOT 'N' DASH Telegraph Set
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Novel Educational Entertaining

Sending and Receiving

Become an expert Telegraph Operator in a very short time

BOYS! BOYS! BOYS!

THROW YOUR VOICE

Into a trunk, under the bed, under a table, back of the door, into a desk at school, or anywhere. You get lots of fun fooling the teacher, policemen, peddlers, and surprise and fool all your friends besides.

The Ventrilo

is a little instrument that fits in the mouth out of sight. Cannot be detected. It is used in connection with the above, and with the aid of this wonderful DOUBLE THROAT, OR VENTRILO, you can imitate many kinds of birds, animals etc. Remember you get everything for ONLY TEN CENTS—a booklet giving you full instructions how to become a ventriloquist and throw your voice, also the Double Throat, or Ventrilo, the Original Bird Call and Prairie Whistle for giving imitations of birds and beasts, etc.

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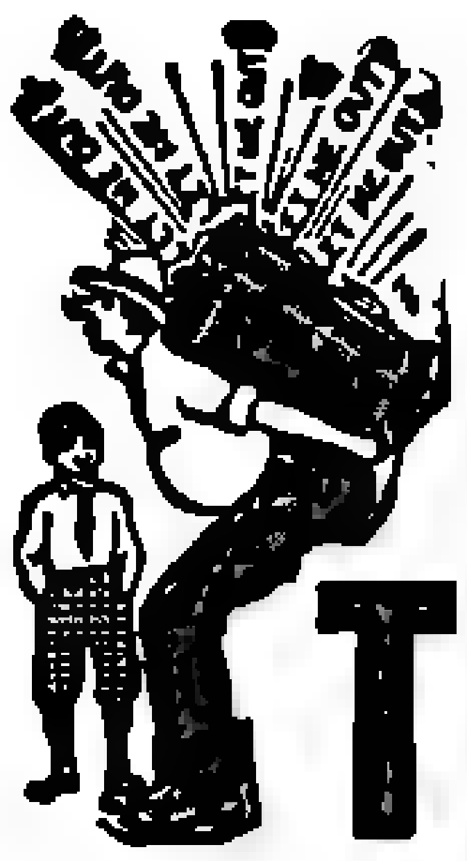

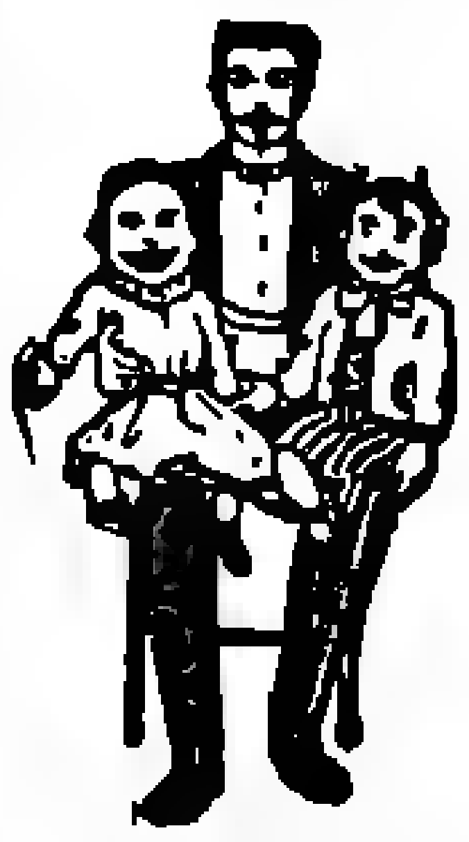

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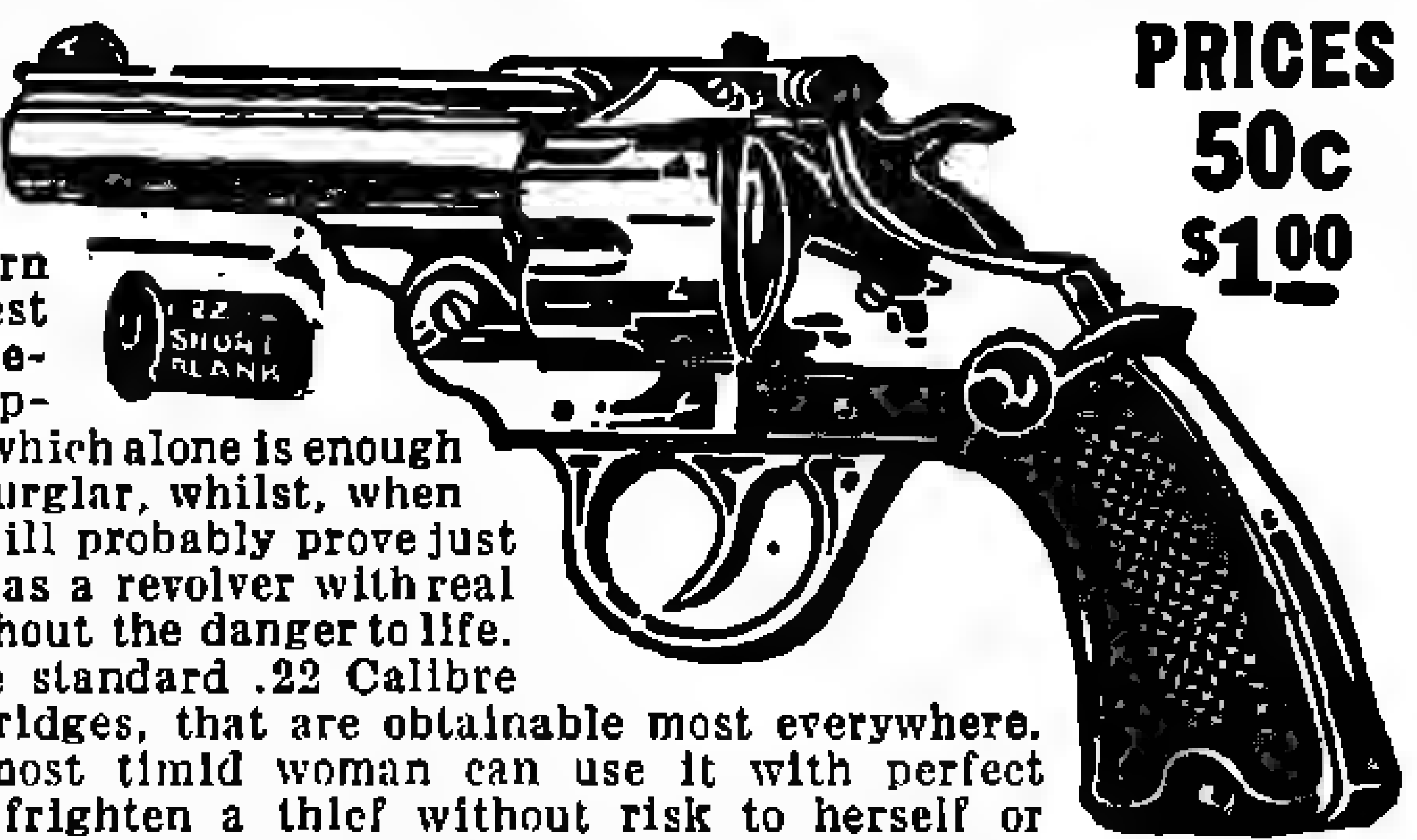

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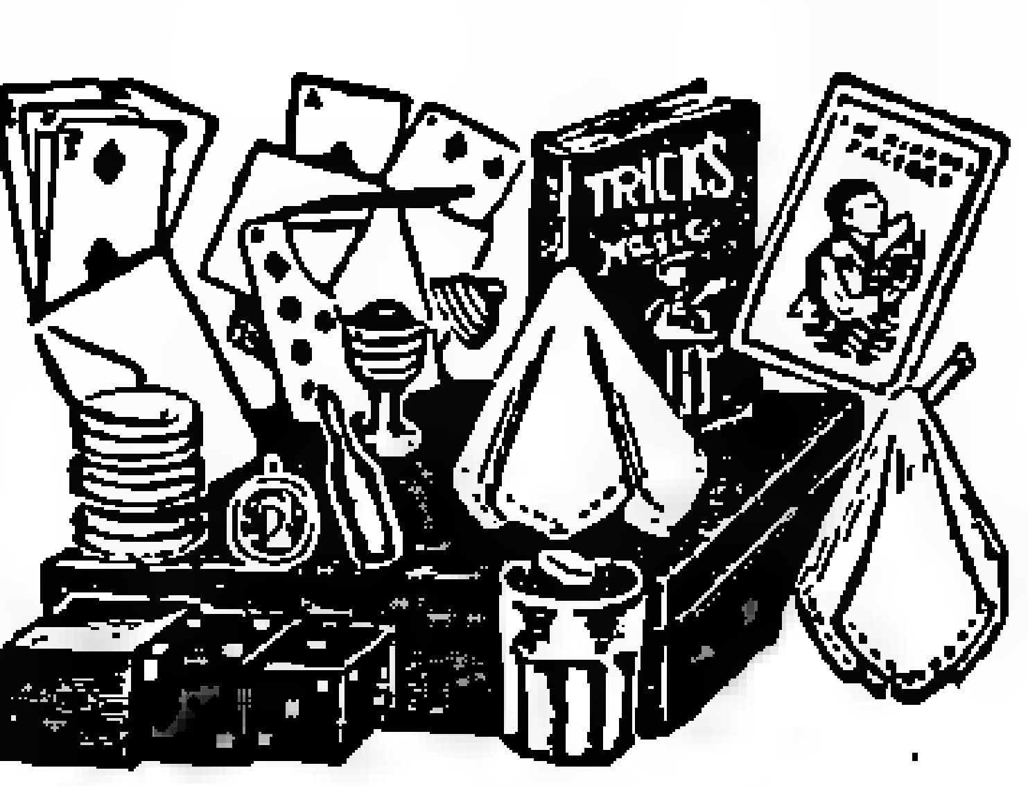

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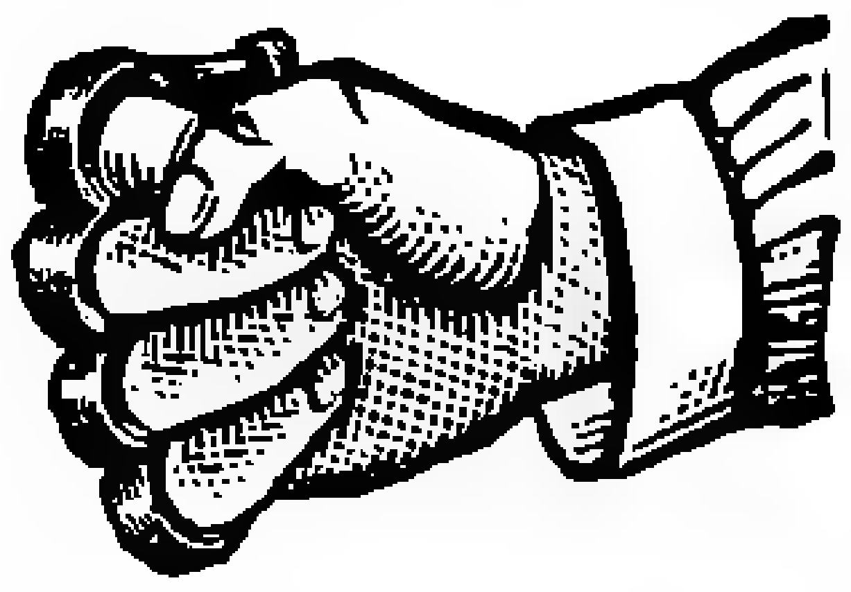

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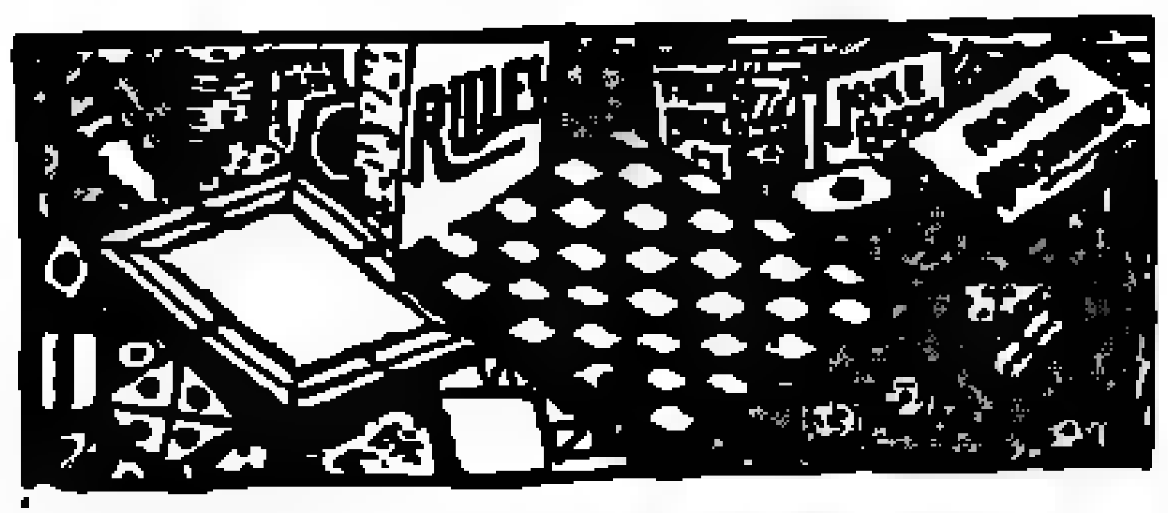

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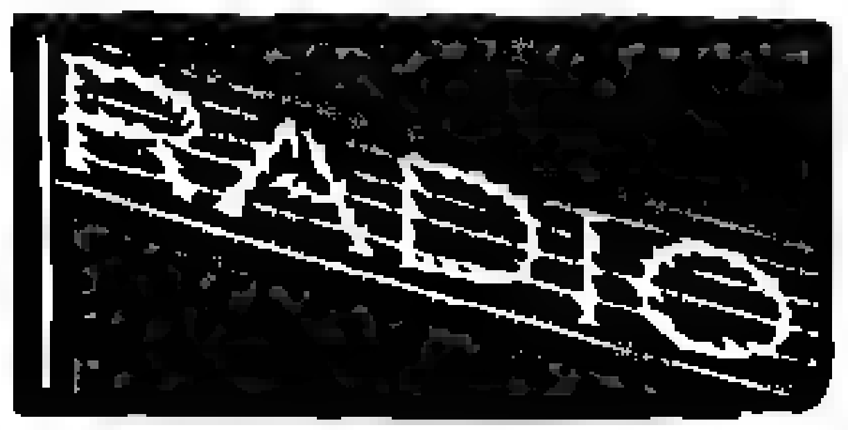

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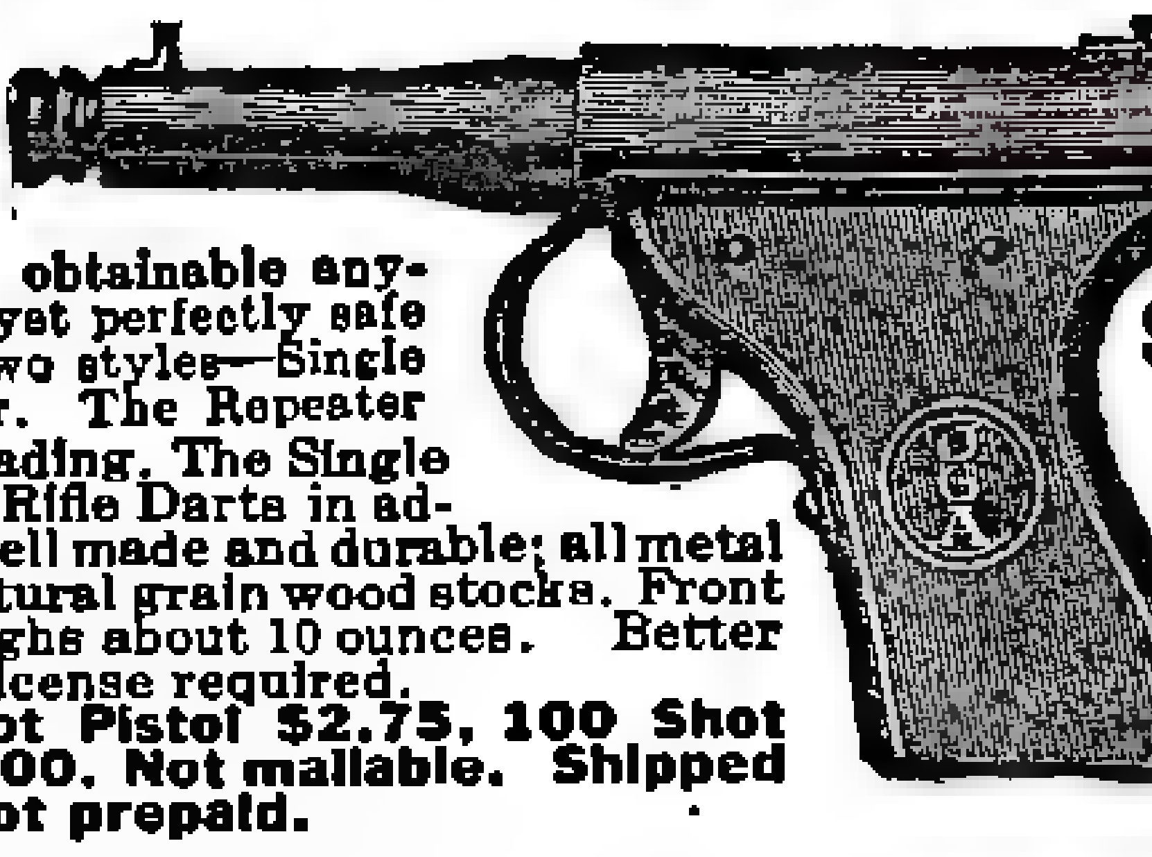

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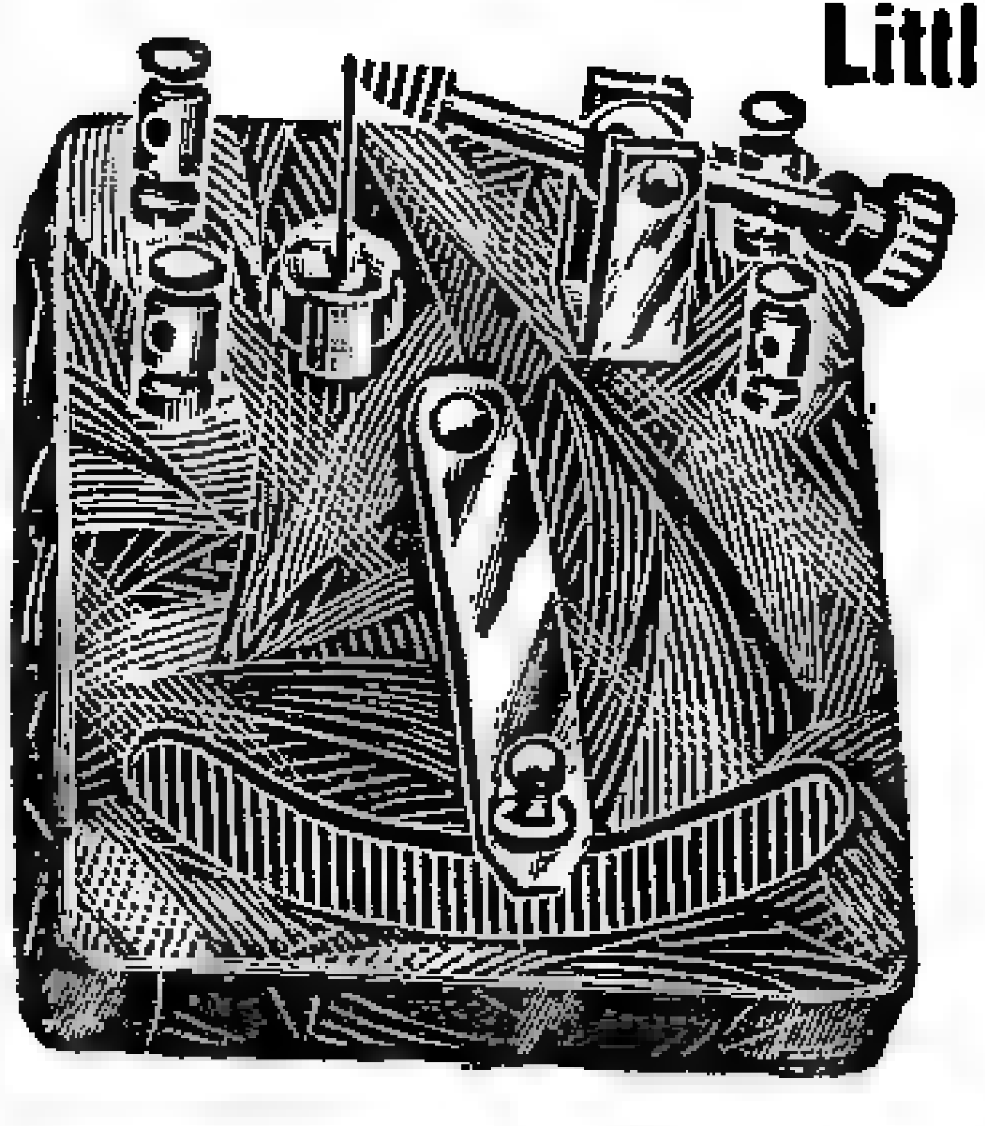

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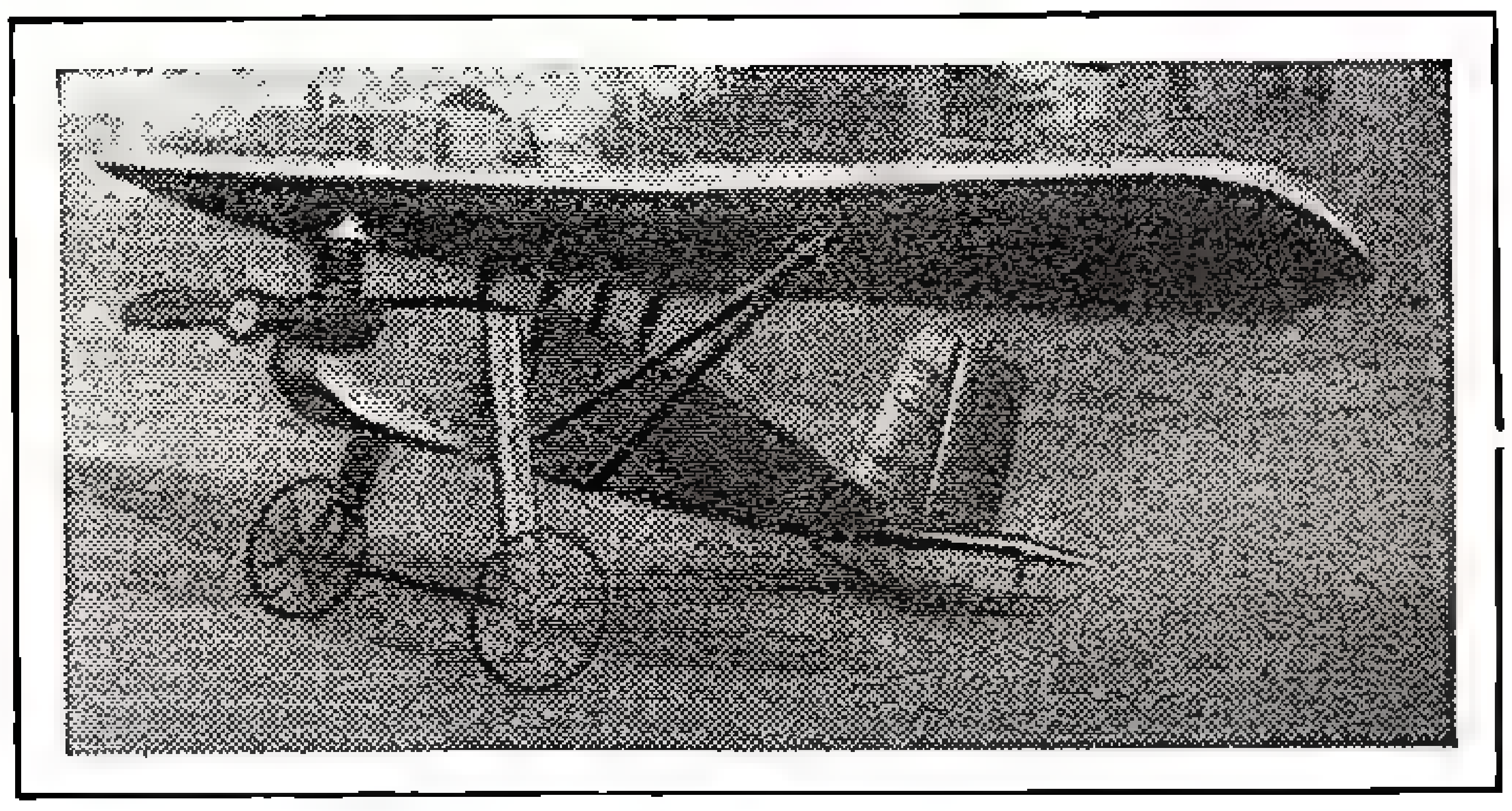
How To Build 20 Boats—On All Newsstands—50c

ANDY'S SHOP MAIL BOX

(Continued from page 24)



A pint size Parasol 'plane properly powered with petite petrol motor makes pretty hops. Read the letter in text to get the truth.

Now as if there weren't enough pesky things in this Vale of Tears we called the World, what with this pig Parachute, I gets me a note from the Managing Editor. "Git something like continuity into this line of tripe."

Bet he thinks I just take letters and paste 'em up and let it go at that. Say, do I take orders from any Man. Ed? Listen to what I wrote back, sassy like:

"I agree with you. I will join the letters together with my incomparable wit, sagacity and crackpated opinion. I am here to please."

And boy, I mean it.

So, just to show you what continuity is, look at the last letter: that ship of Kennedy's and Beamgard's. It's about an airplane. The airplane flies and all that sort of thing. So after the letter we remark about what a swell ship it is (continuity, you see) and reach right up the sleeve to pass from the sublime to the diminutive, and produce another letter about a little shoat of an airplane made by Hilary Strzelczyk. Are ya listenin'? H'mm?

Dear Andy:

Just got the fourth issue of M.P.M. (Mechanical Package Magazine). Whoa, I ain't going to say it's a great mag. so don't get big headed. Enclosed is a few pics of a plane I have built. It flies! It has a wing span of (6′ 2″) six feet two—about 4½ feet long. I completed this a couple months ago and believe I beat your mag. to it.

This ship is powered with the Gil Aero Midget developed in Chicago, is balanced fine, flies good, etc., etc.

Sorry, haven't got any pics of it in flight. Maybe you'd like to print one in your column. It looks awkward but don't say it flies awkward.

Yours,
Hilary Strzelczyk,
19 Kelly St.,
Luzerne, Pa.

P.S. I guess I give in. The mag. is great.

I won't say it flies awkward, Hilary. If you want me to be real frank, I'm smooth. The only awkward thing I can criticise myself for is my inability to whistle that last handle of yours.

(Continued on page 31)

When

Doors Won't Open
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In these times when pennies count, many home owners put up with the inconvenience of household devices which don't operate at full efficiency because they hesitate to run up a big bill with the repair man. Wise householders make their own small repairs—and big ones, too—enjoying the full efficiency of their homes and keeping dollars in their pockets to spend for other things. Any handy man will find it no trick at all to repair plumbing, plaster, concrete, electric equipment, etc., following the explicit directions in the

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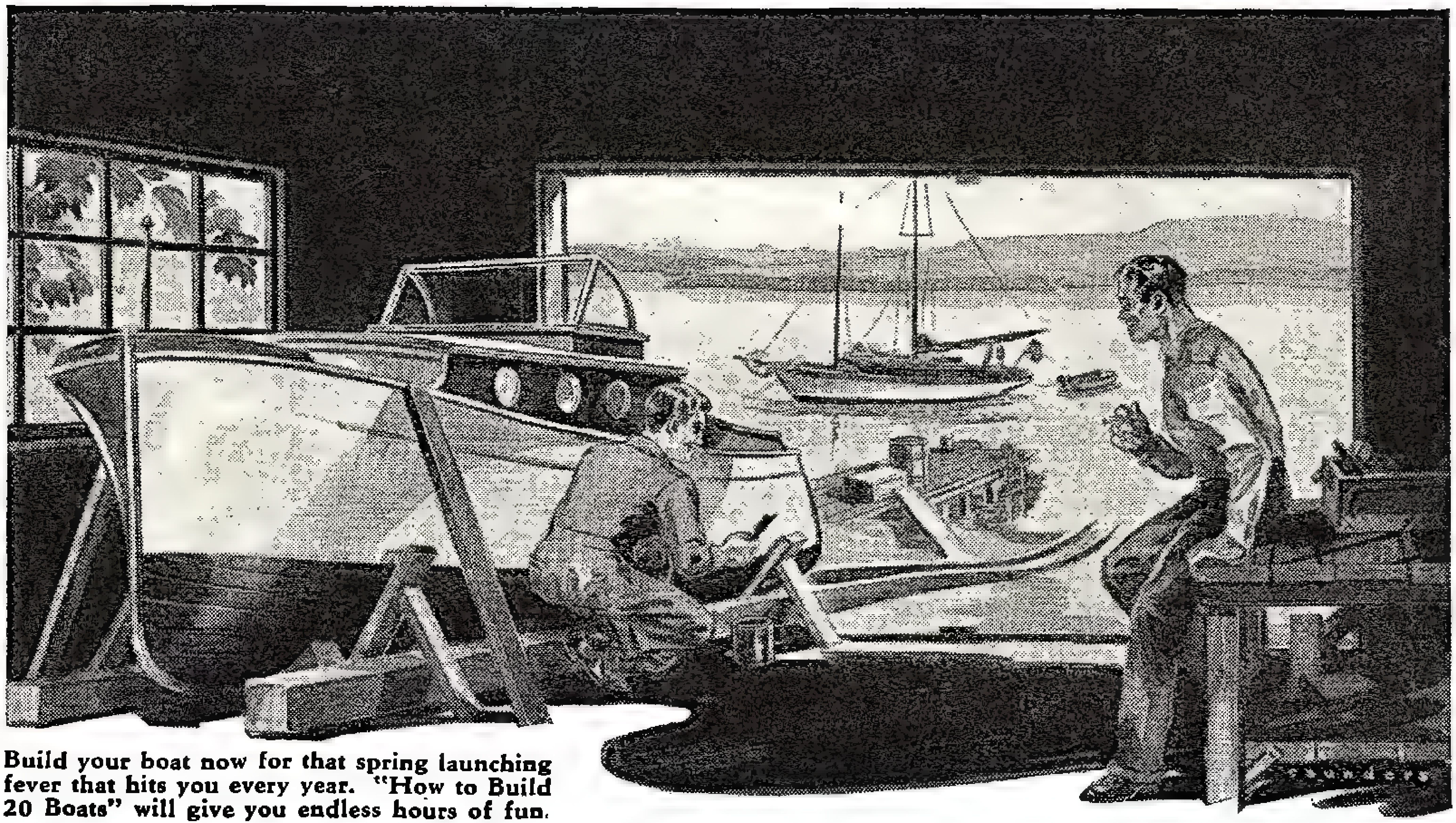

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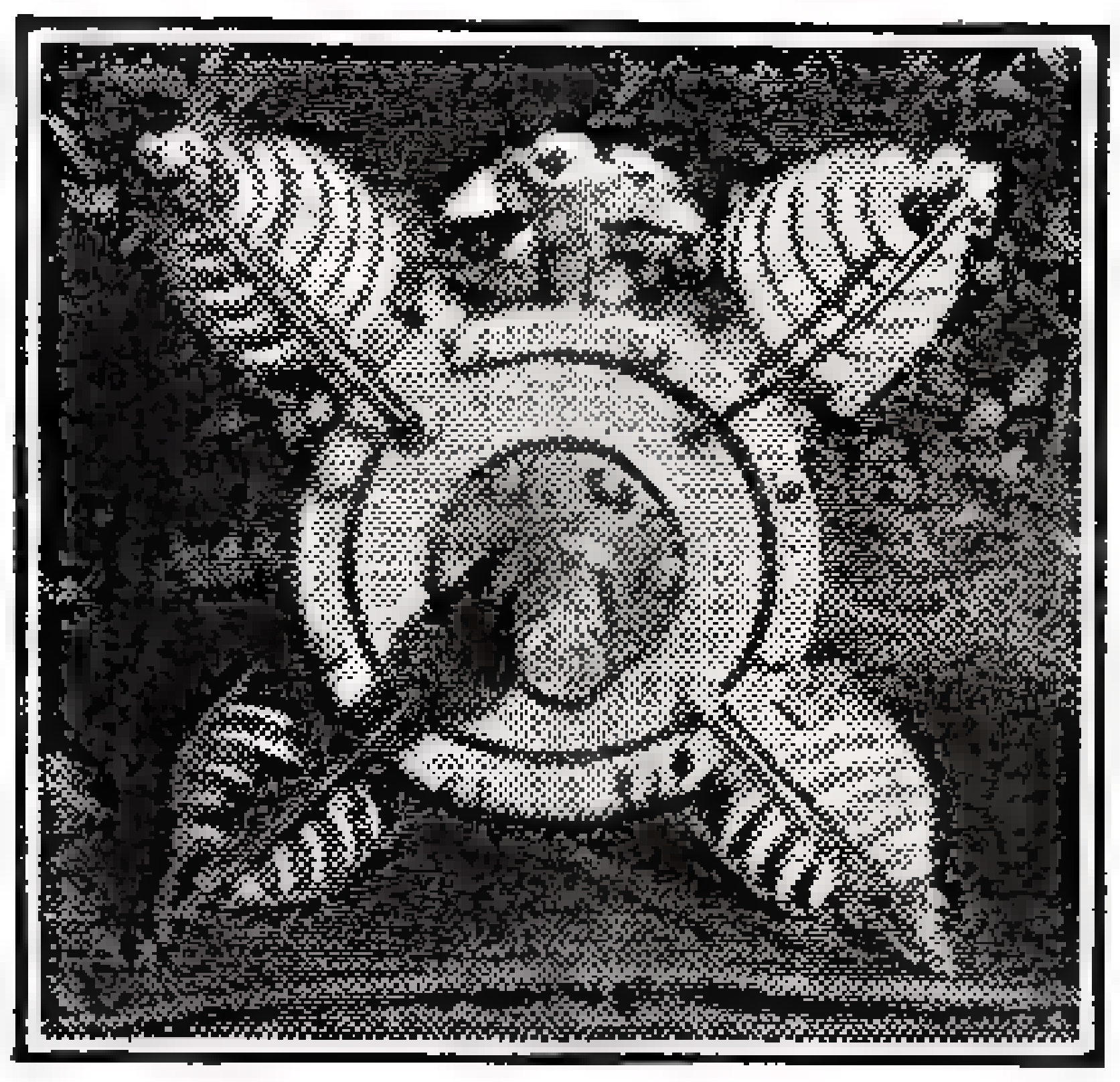
ANDY'S SHOP MAIL BOX

(Continued from page 28)

We had a lot of fun with our little Packmag Pietenpol model. At Christmas time a west coast department store magnate wired us to ship it off to him, and off she went as a gift to some lucky kid the old man wanted to please.



Bang, bang, bang. Now speaking of engines and exhaust noises, glimpse yonder X engine built by Russell (L.) Bourke, of Petaluma, Caylifornyia. It, like Parachute, our pig, will run day and night in any position. Sweet work, Russ.

Now to keep the continuity, we reach up into the old sleeve again and say "Bang, bang, bang." That is the sound of an exhaust.

Now speaking of exhausts reminds me of the motor that Russ Bourke of Petaluma, Cal., built. Here's his letter and a pix.

Box F 2,
Petaluma, Cal.

Dear Sirs:

Being a constant reader of your magazine, and deriving the most enjoyment from reading about all the new scientific and mechanical advances, and what other readers are doing in their shops, I thought perhaps some of your readers would enjoy reading about my "Silver Eagle," a small, Radial-Ex Aeroplane engine, which I built in my home workshop.

It weighs forty-five pounds, and develops 40 h.p. at 1,400 r.p.m., is air cooled, has full-splash lubrication, crankcase holds 3 pints of oil, no oil is mixed with the gasoline.

It is a modified 3-Port, 2-Stroke cycle principle, having no valves or gears.

As there are four power impulses to one revolution of the crankshaft, I use a four-cylinder distributor from a car, directly connected to end (rear) of crankshaft.

It has a 2½-inch bore, 2-inch stroke and the two main and connecting rod bearings are "S. K. F." ball bearings. The crankshaft is a two-piece single throw, without counter balances, which are unnecessary due to the power overlap—(power impulses every 90°.)

I will not mention the full consumption only to say it is most economical, for no one would believe it.

It runs either clockwise or anti-clockwise, right side up, or down, crankshaft in a horizontal or vertical position, with the same efficiency.

The dimensions are 17" frontal height, and width, 6" long—front to rear.

I am planning to build a larger one this spring, of 100-150 h.p., as I feel a material reduction in weight per h.p. can be effected.

Wishing you continual success, I remain,

Respectfully,
Russell L. Bourke.

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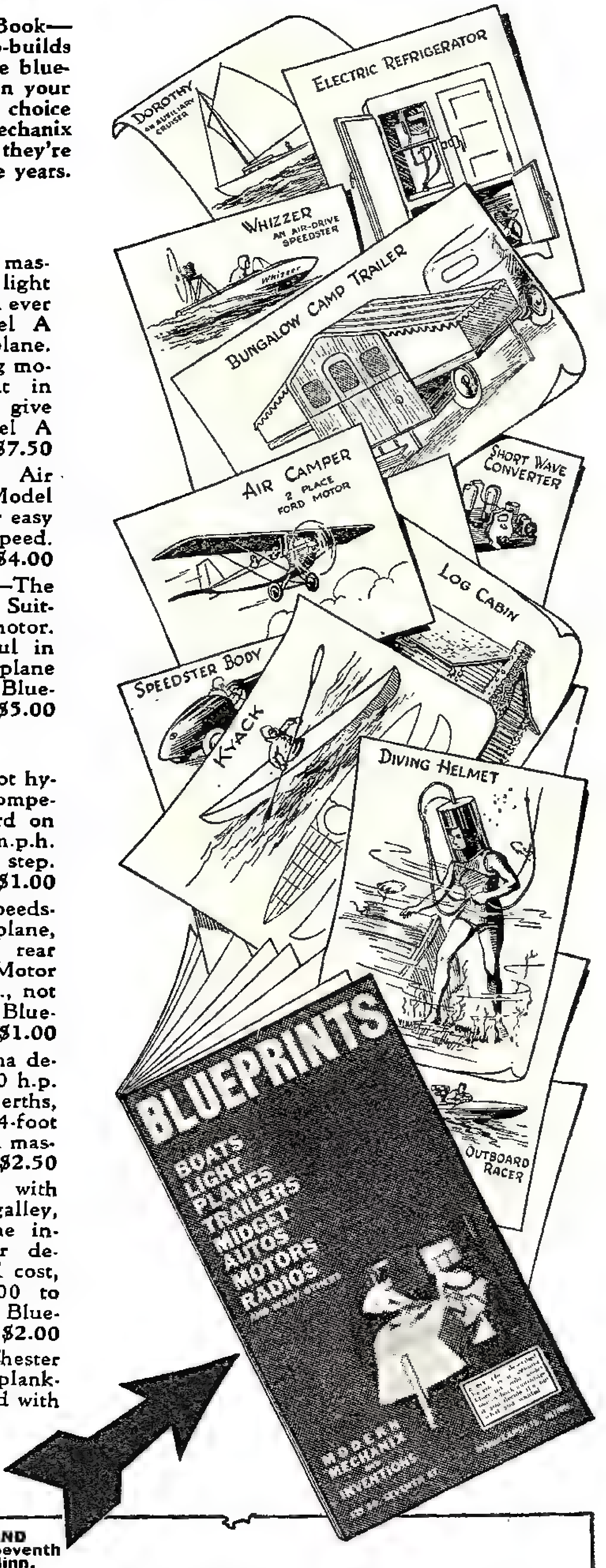

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ESKIMO KYACK—Simple little one-man rough-weather canoe, completely covered except for space where paddler sits, making it practically impossible to swamp. Construction is simple, layers of tough kraft paper, bound with varnish, being used for covering. Tested and designed by Sam Rabl. Price of blueprints $1.00

DIVING HELMET—With this helmet, constructed of odds and ends which cost but a few cents, you can explore lake bottoms as deep as 30 feet. A fascinating new world opens up before your eyes. Money can be made with it, too, recovering outboard motors and other objects lost in the water. Blueprints $1.00

ELECTRIC REFRIGERATOR—Blueprints show you exactly how to construct an electric refrigeration unit, and printed directions supplement the diagrams. At a cost of around $40 you can construct an electric unit for your icebox that serves as efficiently as a manufactured model costing five times as much. Blueprints. .$1.50

SCRAM—Newest addition to the boat plan list. She is 15½ feet of dynamite, inboard motored—will do around 40 with Ford A engine. Forward and aft cockpits, with motor between. Can be built in a garage, and is a flashy performer. Prints include drawings for marine conversion of Model A Ford motor. Blueprints $3.00

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Getting Personal With Biggest Bears

(Continued from page 60)

"Her mate was just behind on a little knoll, but as soon as that old sow let out that roar, he came in sight over the hill. He stopped for just a second to size matters up, then charged straight for where the two of us were standing, right out in the open. I knocked him down with the first shot, breaking his left front leg but he got up and kept a-coming. My partner and I hit that bear 11 times while he was coming not over a hundred yards and when finally he went down he was less than a dozen feet from us. Don't ever tell me a brown bear won't charge."

"Stopping a charging brownie at close range," says Jay P. Williams, Forest Examiner for Alaska, "demands only a moderate amount of skill as a marksman, but does place a great deal of emphasis upon steadiness and coolness. The roar of one of these big brutes at close range, and especially if wounded, is disturbing and nerve-wracking but it must be met with the single-minded determination to aim carefully, squeeze, not jerk, the trigger, and with faith in a favorable result. To get away with it successfully even once means a great strengthening of morale and self confidence which will prove to be a valuable and steadying influence in the next encounter."

Mr. Williams is convinced that these bears rank with many of the most dangerous jungle animals in Africa. He explains:

"While it is not generally recognized, it is really true that hunters and other visitors to the Alaskan forests are sometimes called upon to face a situation fully as critical and death-dealing as those which confront the African big-game hunter. Whether the brownie has thirty or forty times more power than is necessary to mangle an unarmed man is not pertinent to the situation. The important fact is that the animal must be stopped virtually in his tracks to insure a man's safety.

"It was the opinion of a celebrated African big-game hunter and writer, whom I met last summer, that it is easily possible to encounter these giant bears under conditions and situations which are on a par with those which the African hunter is called upon to face. A lion may cover ground faster, but his charge is generally met in the open while a charging bear is generally encountered in heavy cover. Even a small brownie, weighing perhaps only 1,000 pounds, is probably a harder animal to kill than is the lion, especially when enraged, which is another peculiar feature. When a bear's fighting blood has been thoroughly aroused, no matter how many times he has been hit, he keeps on charging.

"There has been much recent discussion of this whole subject. Some people advise you to run away and climb a tree, since the brown bear does not climb. This may be advisable under some conditions but in many other cases it is not possible. There are situations when the only salvation is to shoot it out."

Of course, however, this ferocity of the brown bear towards human beings is only one angle of

(Continued on page 34)

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Getting Personal With Biggest Bears

(Continued from page 33)

the situation, so far as Uncle Sam is concerned. Our government realizes that this interesting animal, the largest carnivorous land mammal in the world, is very valuable for scientific reasons and a great attraction to tourists. Which explains why the Senate's special committee on the conservation of wild life resources recently completed a study of the brown bear, offering these conclusions: "It is recommended that Afognak Island, which is immediately east of Kodiak Island, be set aside by Executive Order as a perpetual sanctuary for this bear. It is further recommended that the Alaskan Peninsula, the Kodiak Island group just south of the Alaskan Peninsula, that part of Alaska south of the Alaskan range west of 141 parallel longitude, and the islands of Chichagof and Admiralty, the principal range of this bear, be specially watched and the natives in this range be put on the same basis as the non-resident sportsman, instead of being given unlimited privileges without restriction as to season or bag limit.

"This would mean that the native and the resident Alaskan would be allowed to kill not more than two bears a year, and only in the open season, which is now from September 1 to the 20th of June following. This would furnish a record of the kill, put everyone under the regulation, and the seasonal bag limit could then be easily reduced to one bear if the situation so warranted."

Since this recommendation was made by the Senate's special Committee acting under the Seventy-second Congress, an official government brown bear census has been completed on Admiralty Island, located in southeastern Alaska. The nearest point on the island is about 12 miles from Juneau, the capital of the territory. The island is 100 miles long, north and south, with varying width, averaging approximately 25 miles. Admiralty has an area of 1,664 square miles, is heavily timbered with dense forests of spruce and hemlock and an isolated mountain range. The census was made through a cooperative field trip by the Alaska Game Commission and the Alaska branch of the Forest Service. The number of large brown bears and grizzlies on the island was estimated at about 900—about one bear to every 1¾ miles. These figures, according to government investigators, since they were taken on one of the best known "brown bear" islands in Alaska, refute conclusively the widely spread tales about the bears "being on the verge of extermination." The conclusion of the Federal experts is: "In the huge reserves of Alaska not only are the bears thriving but they continue to range in undiminished numbers throughout the greater part of the territory."

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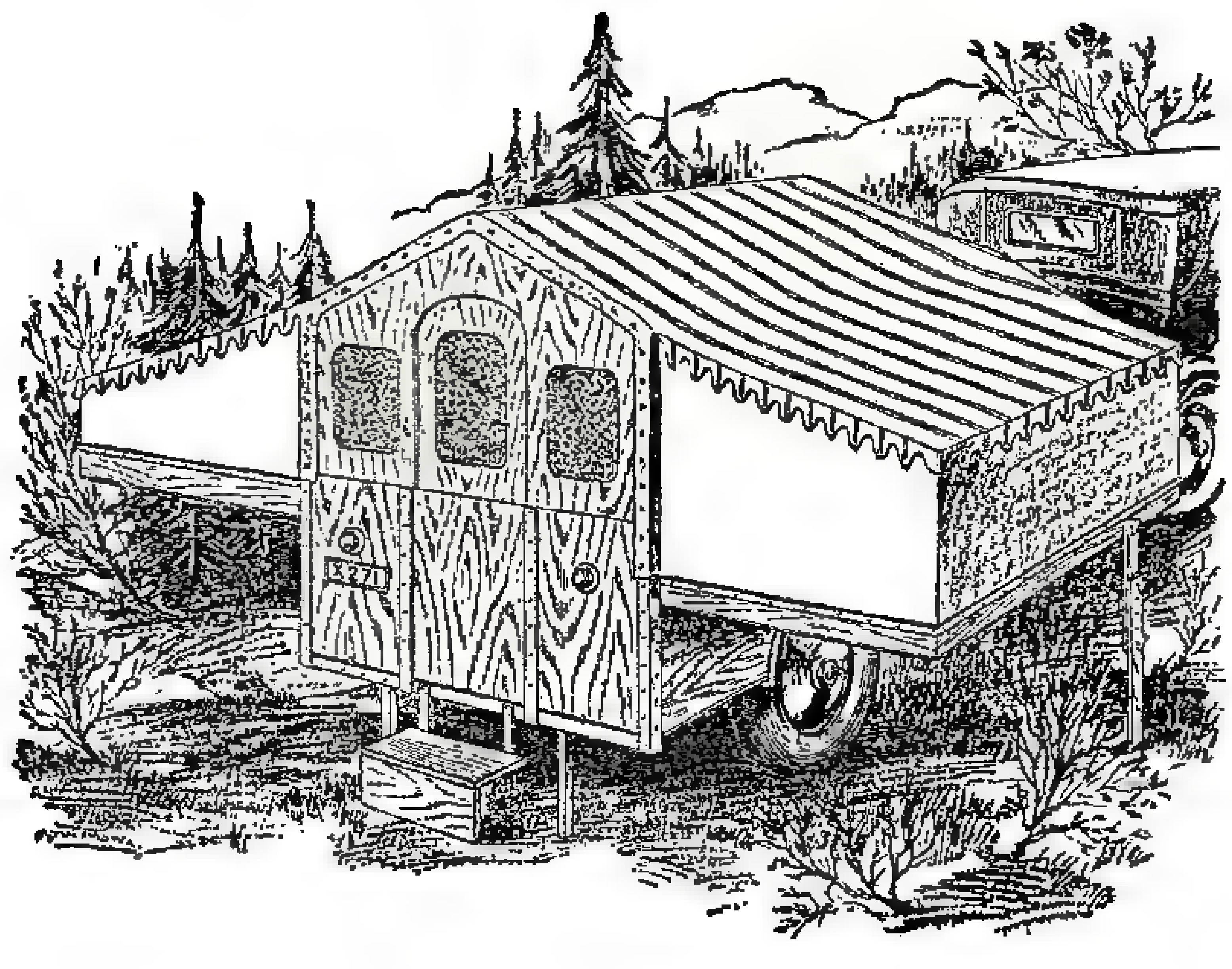

This Bungalow on Wheels

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NO WONDER this trailer has proved to be the most phenomenally popular how-to-build project in years! Literally hundreds of them have been built since the plans originally appeared in the May, 1932, issue of Modern Mechanix and Inventions. The illustration above shows the outfit in camp for the night, unfolded as a house. For traveling, the side balconies are folded inward, the roof top down, and presto! you have an easily towed trailer which allows complete vision from the rear window of your car.

Chassis of the trailer is built up out of the front axle unit of a junked car—almost any type will do. Only ordinary tools are required. Roof is of waterproof canvas. Bedsprings are contained in the projecting balconies. Provision for running water and household equipment is made.

BLUEPRINTS show the trailer layout with all dimensions. Prints are large size, specially made for shop use, easy to read. Any man who can tell a hammer from a saw can put this trailer together to last for years. Price of blueprints, postpaid $1.00

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In the World of

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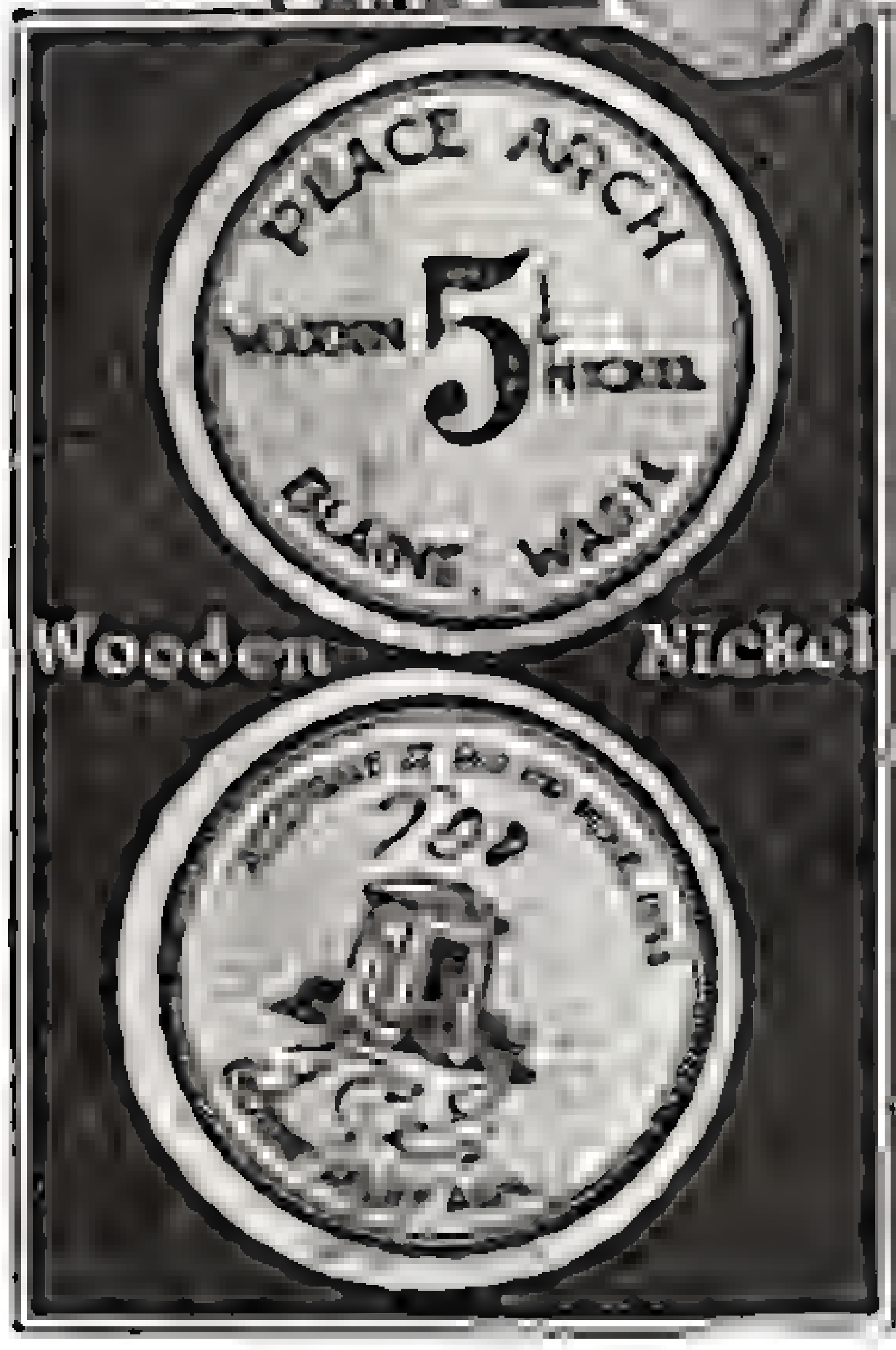
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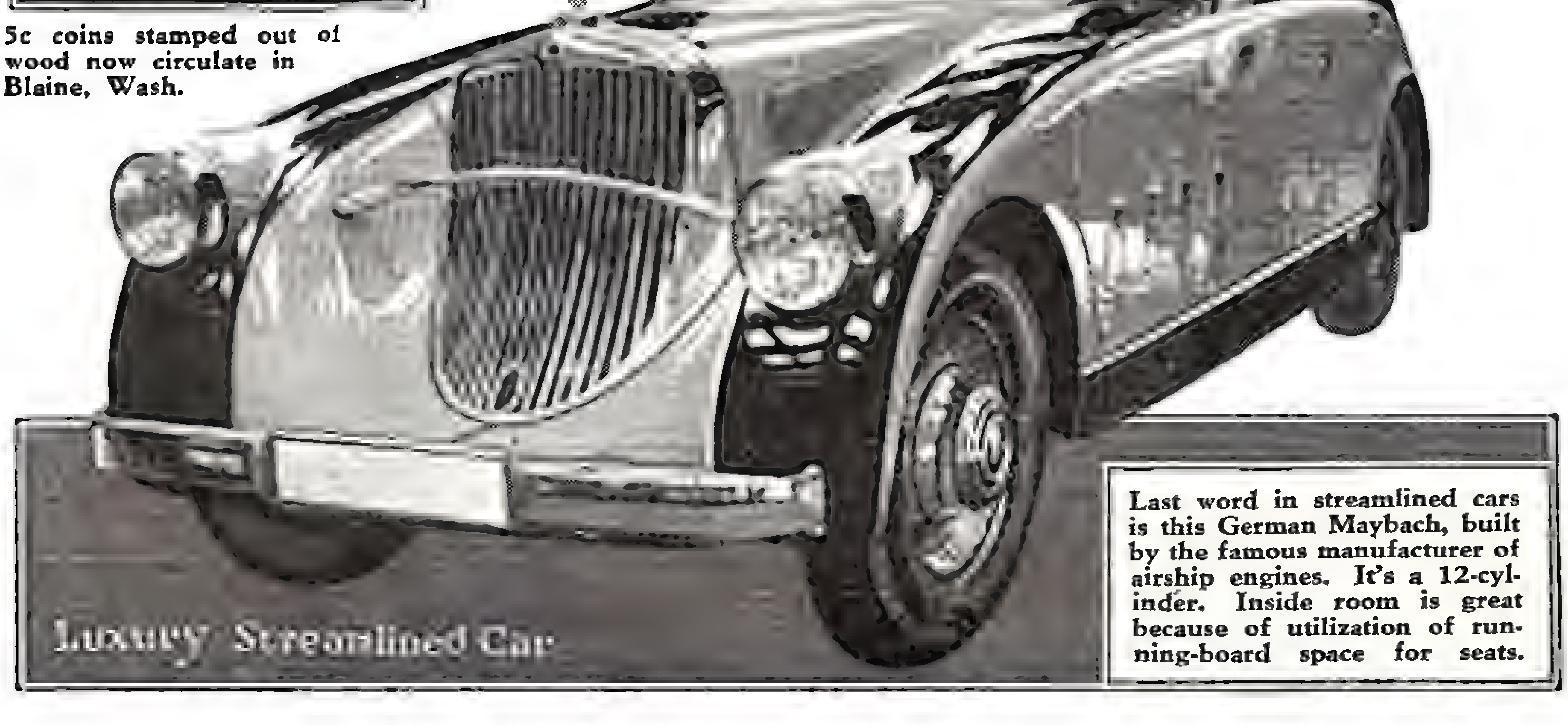

Luxury Streamlined Car

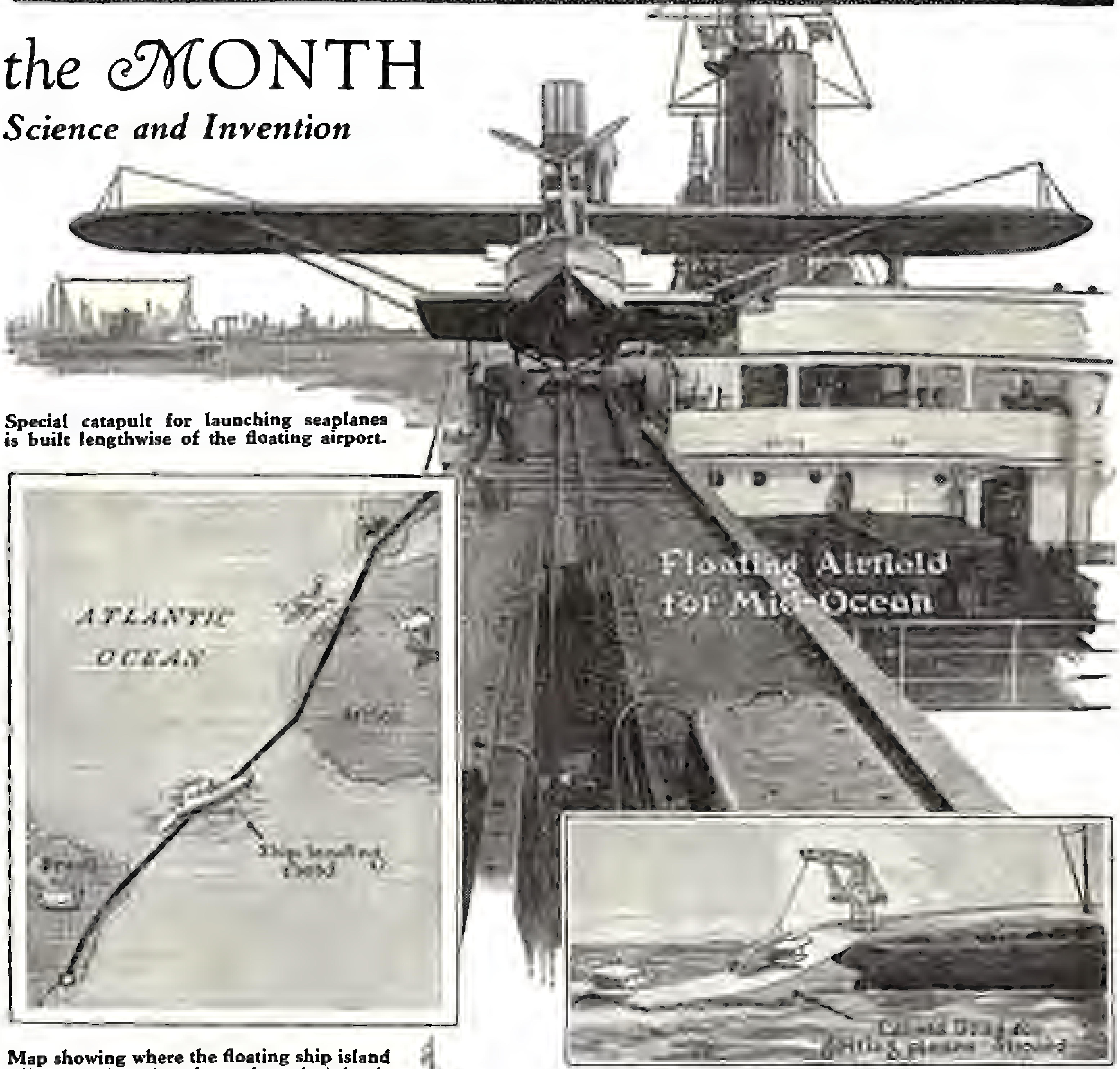
Last word in streamlined cars is this German Maybach, built by the famous manufacturer of airship engines. It's a 12-cylinder. Inside room is great because of utilization of running-board space for seats.

AND INVENTIONS

MINNEAPOLIS, MINNESOTA — MAY, 1933

the MONTH

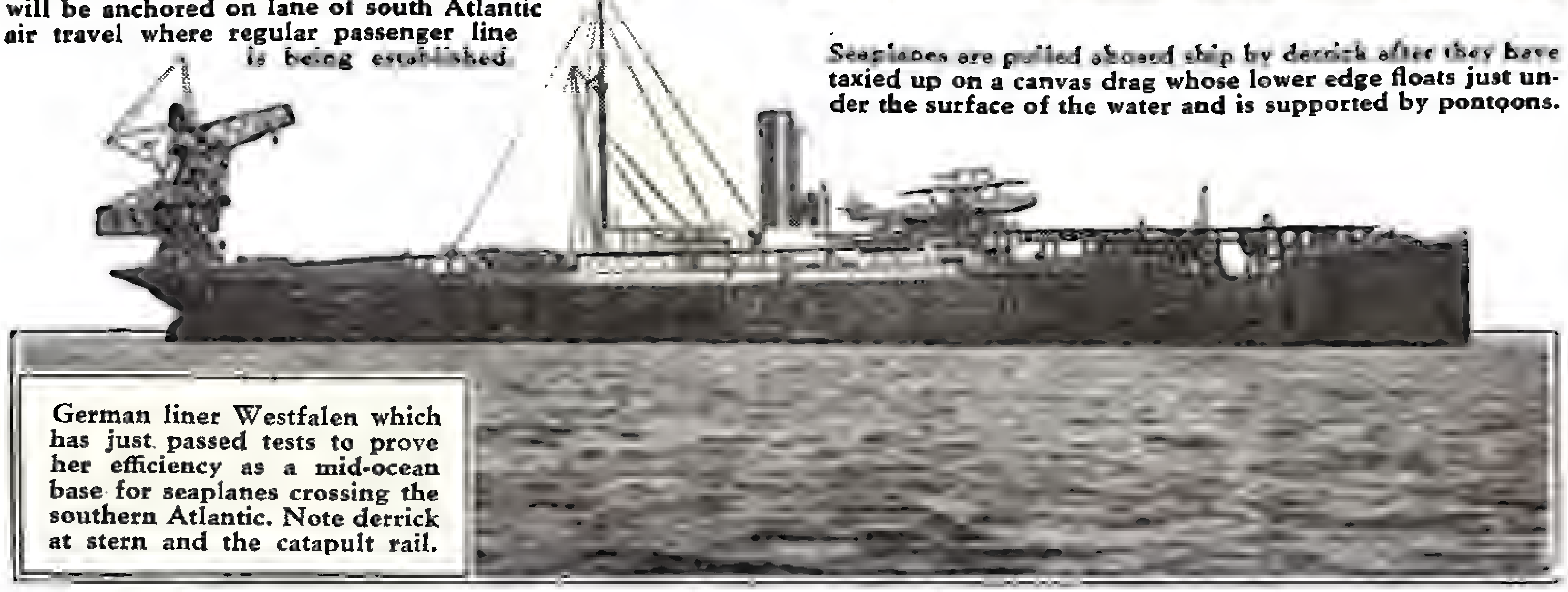
Science and Invention


Floating Airfield for Mid-Ocean
ATLANTIC OCEAN
Africa
Brazil
Ship landing field

Special catapult for launching seaplanes is built lengthwise of the floating airport.

Map showing where the floating ship island will be anchored on lane of south Atlantic air travel where regular passenger line is being established.

Seaplanes are pulled aboard ship by derrick after they have taxied up on a canvas drag whose lower edge floats just under the surface of the water and is supported by pontoons.



German liner Westfalen which has just passed tests to prove her efficiency as a mid-ocean base for seaplanes crossing the southern Atlantic. Note derrick at stern and the catapult rail.

Jap Pilots Ride to DEATH

The current conflict between Japan and China has brought out an amazing revelation of the methods by which Japanese pilots assure air bombs reaching their target by putting a man inside to steer them. Why? Read the reasons in this article, and you'll have a better understanding of Japanese psychology toward the machines of war.

IMAGINE yourself strapped within a hollow chamber inside a huge air bomb, surrounded on all sides by high explosives. In front of you is an airplane type rudder which steers the tail unit of the bomb. Windows in the nose enable you to see ahead.

You're loaded into the bomb, which is placed in its nest under the fuselage of a bombing plane. The bomber takes off, soars above a target—say, an ammunition dump of the enemy. Up above you, the pilot of the plane pulls a lever.

Down you go, plunging toward the ground with terrific speed. You see that you aren't going to strike the ammunition dump, but will land many yards to one side of it. So you twist the control rudder, swerving the bomb's course. Success! The dump looms up directly below the windows of your bomb. And that is practically the end of things for you.

Sounds like the superheated imagining of a Jules Verne, doesn't it—the sort of absurdity that a sensible man would laugh off as being unheard of, an astounding, amusing impossibility?

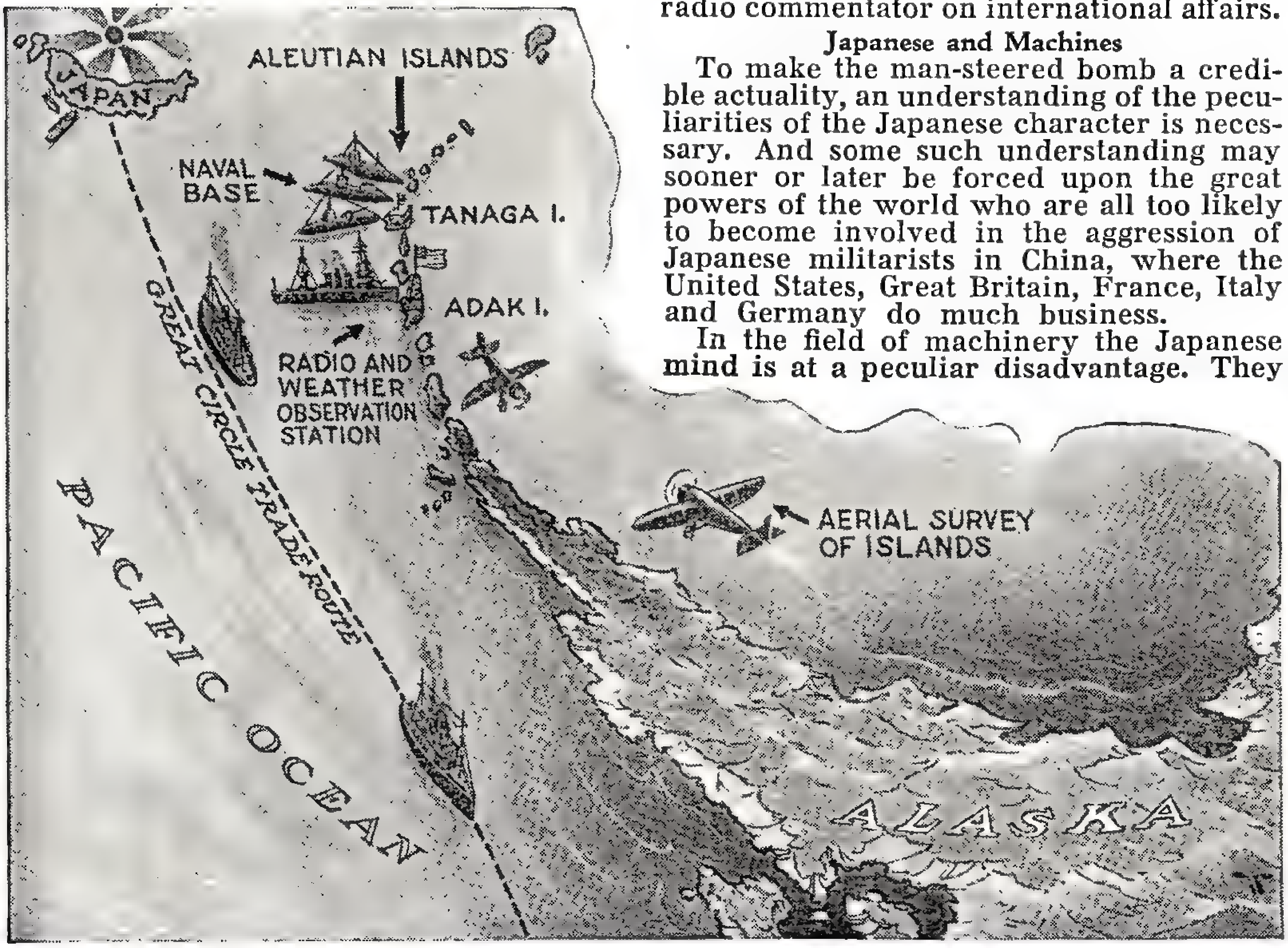
It's nothing of the sort. It's an actual fact of warfare, a method used by Japanese pilots who deem it an honor transcending all others to ride to glory for the mother country. They know that their memory and their families will be forever honored in their homeland.

Rumors of the flying bomb death ride have filtered out of the conflict now being waged by the Japanese and Chinese. Necessarily this information has been of a confidential, undercover nature, but not long ago it was given nation-wide publicity by a radio commentator on international affairs.

Japanese and Machines

To make the man-steered bomb a credible actuality, an understanding of the peculiarities of the Japanese character is necessary. And some such understanding may sooner or later be forced upon the great powers of the world who are all too likely to become involved in the aggression of Japanese militarists in China, where the United States, Great Britain, France, Italy and Germany do much business.

In the field of machinery the Japanese mind is at a peculiar disadvantage. They



Where the U. S. government expedition is now conducting a survey of the Aleutian islands, looking toward the possibility of establishing weather station, air base, naval base and possible fortifications. Note the proximity of the islands to Japan and the great circle course of steamers. Planes are being taken with which to make an aerial survey of the islands.

on Flying BOMBS

by RAY HOLT

are able to turn out an exact copy of any mechanism that comes into their hands, but the type of mechanical imagination which went into its original creation—which, for want of a better term, is sometimes known as Yankee ingenuity—they are at a loss to duplicate.

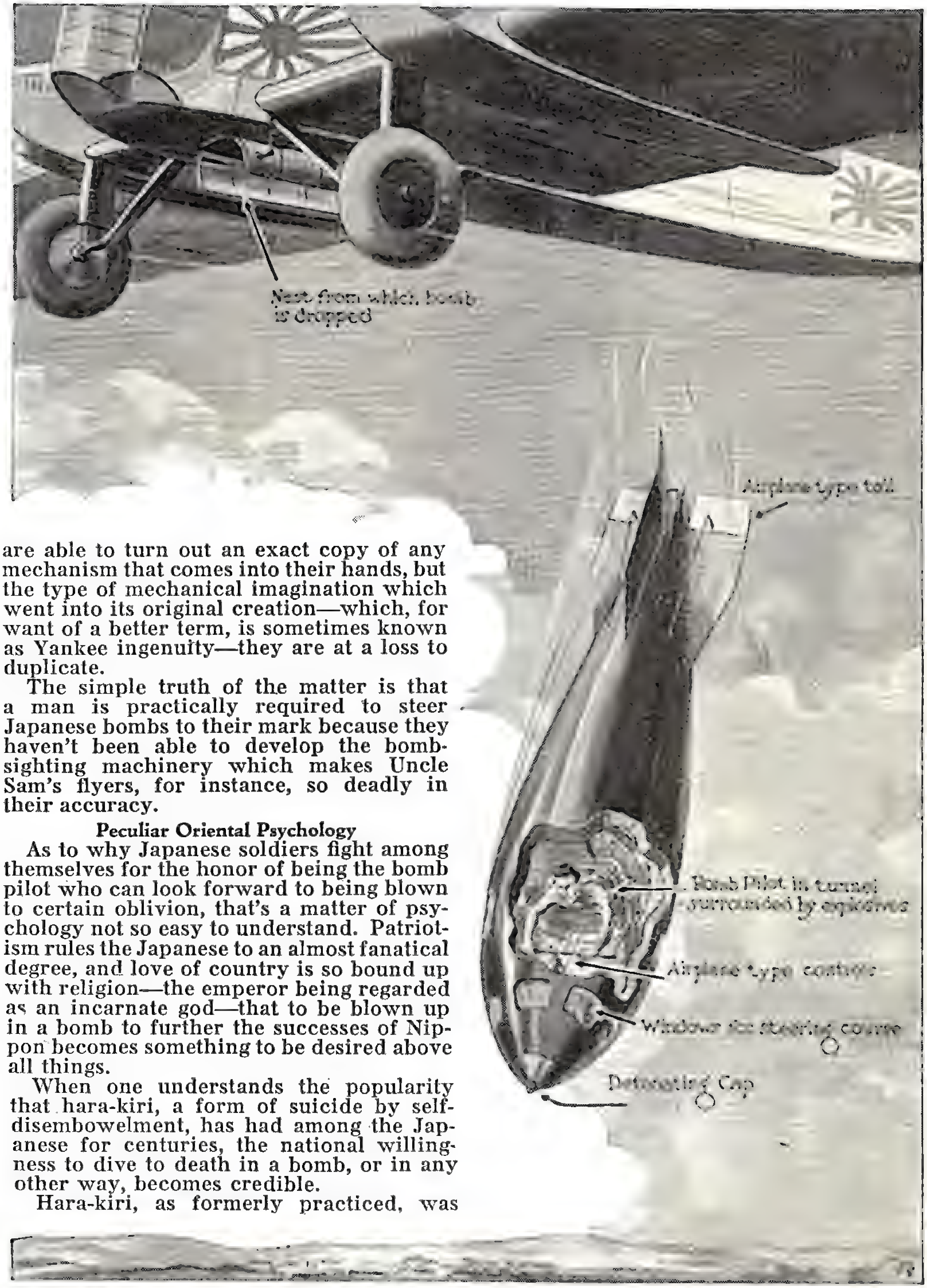
The simple truth of the matter is that a man is practically required to steer Japanese bombs to their mark because they haven't been able to develop the bomb-sighting machinery which makes Uncle Sam's flyers, for instance, so deadly in their accuracy.

Peculiar Oriental Psychology

As to why Japanese soldiers fight among themselves for the honor of being the bomb pilot who can look forward to being blown to certain oblivion, that's a matter of psychology not so easy to understand. Patriotism rules the Japanese to an almost fanatical degree, and love of country is so bound up with religion—the emperor being regarded as an incarnate god—that to be blown up in a bomb to further the successes of Nippon becomes something to be desired above all things.

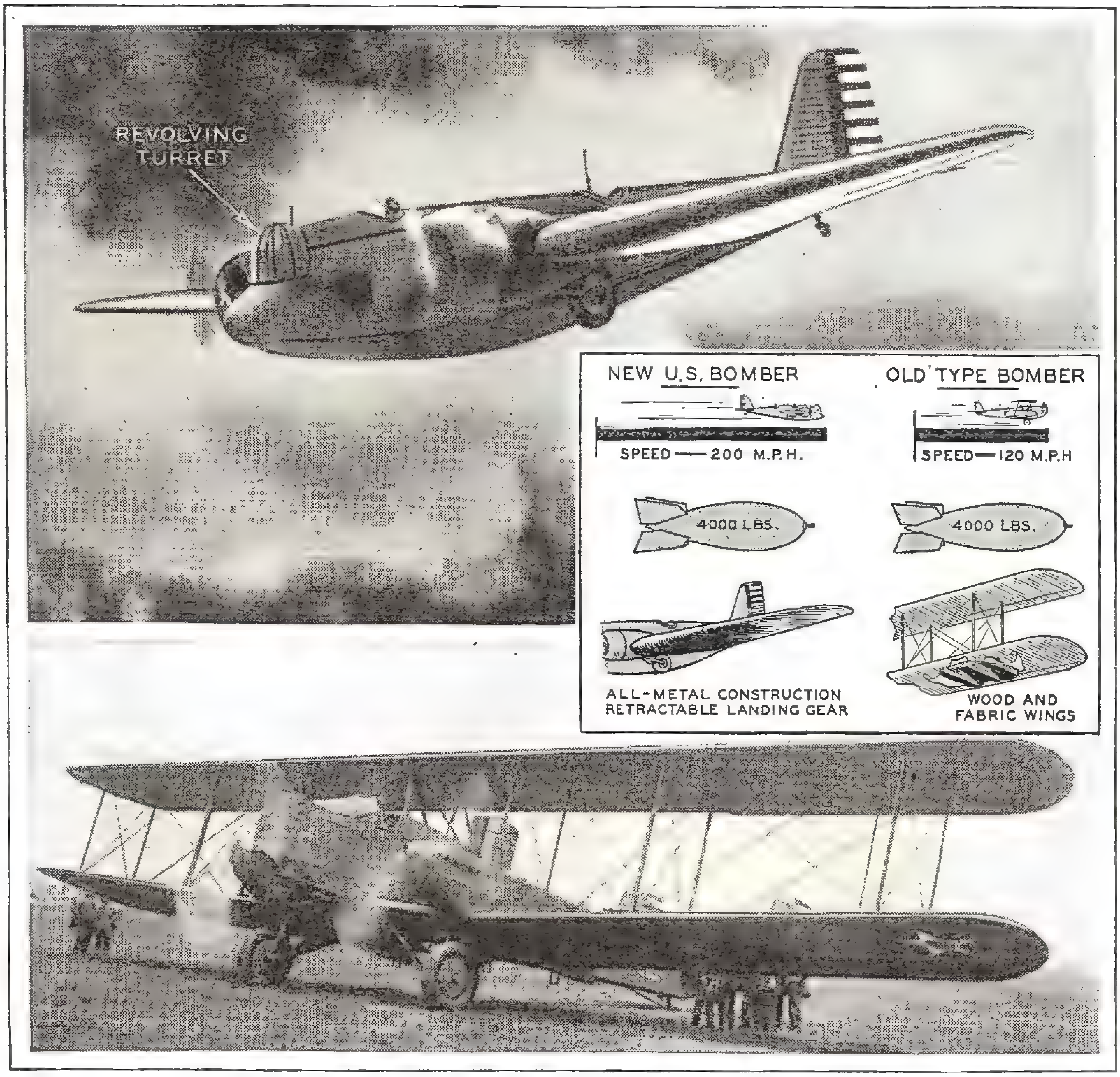
When one understands the popularity that hara-kiri, a form of suicide by self-disembowelment, has had among the Japanese for centuries, the national willingness to dive to death in a bomb, or in any other way, becomes credible.

Hara-kiri, as formerly practiced, was


Nest from which bomb is dropped
Airplane type tail
Bomb Pilot in tunnel surrounded by explosives
Airplane type controls
Windows for steering course
Detonating Cap

Riding to glory for the mother land, a Japanese pilot inside a bomb dropped from an airplane steers it to destruction because Japanese mechanics are unable to design elaborate sighting devices which would assure reasonable accuracy.

Uncle Sam's Latest Bomber Is High-Speed Destructive Terror of the Skies



Top photo shows new U. S. bomber; lower picture is Curtiss bomber used by army up to now. Insert drawings show comparative performances. Superiority of the new design is evident. The revolving turret protects the gunner from windstream and makes for accurate shooting. All-metal construction lessens danger of fire from incendiary bullets.

compulsory upon a noble of the higher class who received a courteously phrased message from the mikado intimating that he must die for some offense of lawbreaking or disloyalty. The suicide, using a jeweled dagger customarily sent by the mikado for performing the act, proceeded in a prescribed ritual. Seated on a dais, surrounded by officials and friends, the suicide plunged the dagger into his stomach below the waist on the left side, drew it slowly across to the right, and turning it, gave a slight cut upward.

This compulsory suicide has been abolished, but the idea has such a striking appeal for the Japanese imagination that some 1500 hara-kiris take place annually as a purely voluntary gesture.

In the final analysis, the amazing thing is not that the Japanese should succeed in finding pilots for their man-bombs, for volunteers for such a mission of certain death can be found in any army in the world, but that such a weapon should be necessary. It simmers down to the fact, as hinted at above, that the Nipponese are conscious of their inferiority in developing new and fearful weapons of war, and are forced to rely on man-power.

A country like the United States would approach the problem of directing bomb flight in an entirely different way. Some method of mechanical control of the bomb would be sought—in fact, the idea of controlling a bomb or gun shell by radio is already being worked on, as described in Modern Mechanix and Inventions some months ago. It will be seen that, entirely aside from making the sacrifice of a man's life unnecessary, radio control of a bomb is much more accurate and less liable to error through the failure of the human machine in a moment of critical nervous tension.

Superiority of American engineering brains over the Oriental variety is well demonstrated in the newest United States army bombing plane, a photograph of which is reproduced in these pages. It is a monoplane of all-metal construction—no wood or fabric to catch fire from incendiary bullets of the enemy—and is so well streamlined, with its landing gear pulled up under its belly, that it can do a top speed of 200 miles an hour, fully loaded with a two ton cargo of bombs. This is 80 miles an hour better than the speed of the Curtiss bomber, a biplane, previously used by the air corps.

Features of U. S. Bomber

A revolving turret to protect the gunner in the nose of the ship is another feature. It diverts the rush of air and makes accurate aiming much easier. At high speeds, the windstream is so powerful that, in an ordinary ship, it has a tendency to wrench a swivel mounted gun out of the gunner's control.

In connection with the possible need of protecting our country from Pacific aggression, the news that a government expedition has just left for an extensive survey of the Aleutian islands (which constitute the tip of the Alaskan peninsula) is important. A map, reproduced herewith, shows the extremely important location of these islands in their relation to Japan and the Orient.

Geologically, these islands are thought to be the sunken peaks of land that once connected the mainland with Asia. Siberia is but a stone's throw distant, and the northern islands of Japan not much farther away. Since, by a recent bill passed in Congress, the United States has relinquished control of the Philippine islands, we will have no Pacific base of importance other than Hawaii and Guam, which makes the Aleutian chain all the more important in the scheme of national protection.

Strategic Importance of Islands

Airplanes are being carried by the expedition and these will make a careful aerial survey of the islands. A weather observation station will probably be established on Tanago or Adak island, and the best suited of the nearby islands will be chosen as a possible base for an airplane field. Harbor facilities will be carefully charted with a view to possible installation of a naval base for ships and submarines. Alaska, of course, is a United States possession which we are free to fortify as we may see fit.

An incident of the World War which has just come to light illustrates the ingenuity of the western mind in the world of machines. German engineers designed a mine fitted with clockwork which permitted the device to float in toward English shores when the tide was right. When the tide ebbed, the mine automatically sank to the bottom, where it waited the proper interval and then released itself again to float closer to the shore. The British were unable to figure out how the mines got there.

Puppets Stage Shows for Children

Top picture, puppeteers manipulating strings; center pictures, two views of puppets in action; bottom photo, puppets with child on stage for comparison of size.

SEVEN years of experiment were required to bring to perfection the life-like puppets shown in the series of pictures above. They are the work of Blake Wagner, Hollywood motion picture cameraman. He uses the puppets in giving shows. The same stunt has proved a money-maker for many men out of employment, who are able to arrange with department stores to give entertainments in their children's departments.

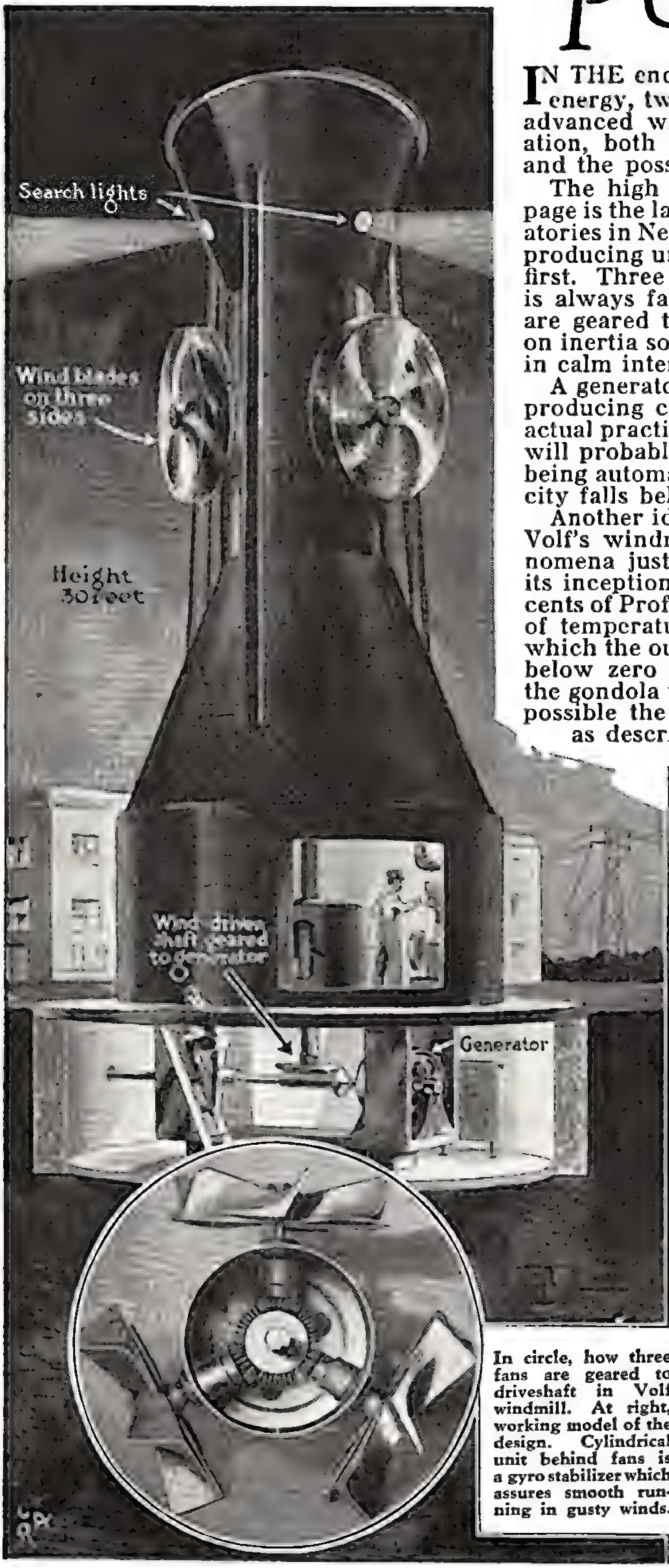
NOVEL NEW MACHINES for PULLING

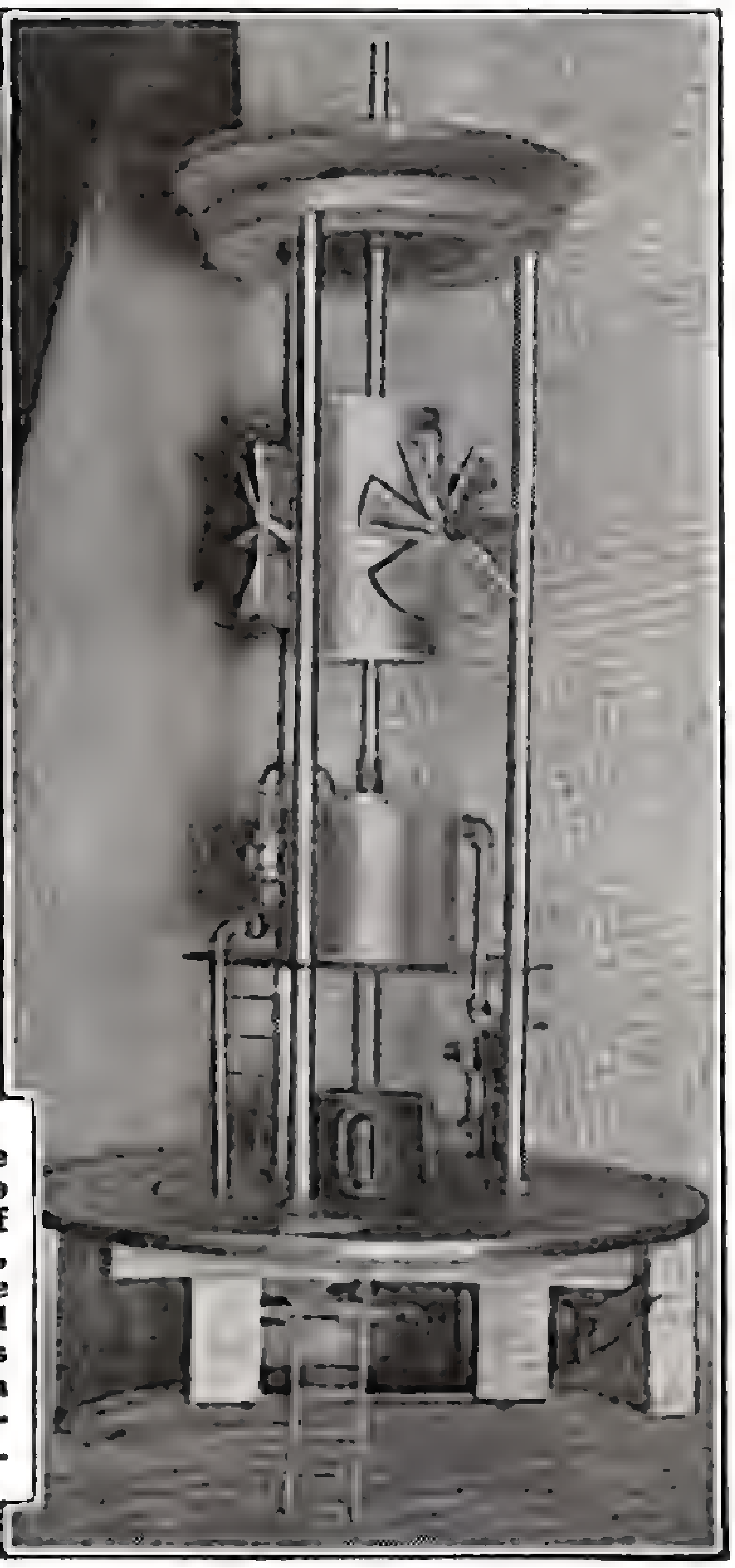
IN THE endless quest for cheap sources of energy, two proposals have recently been advanced which demand serious consideration, both for appeal to the imagination and the possibilities of practical operation.

The high speed windmill shown on this page is the latest development of Volf's laboratories in New York. The first of these power producing units will be in operation by May first. Three fans are provided so that one is always facing a wind current. The fans are geared to a gyro stabilizer which runs on inertia so that the fans will not run down in calm intervals between gusts of wind.

A generator is driven by the geared shaft, producing current for storage batteries. In actual practice three or four small generators will probably be used, one or more of them being automatically cut out when wind velocity falls below a certain point.

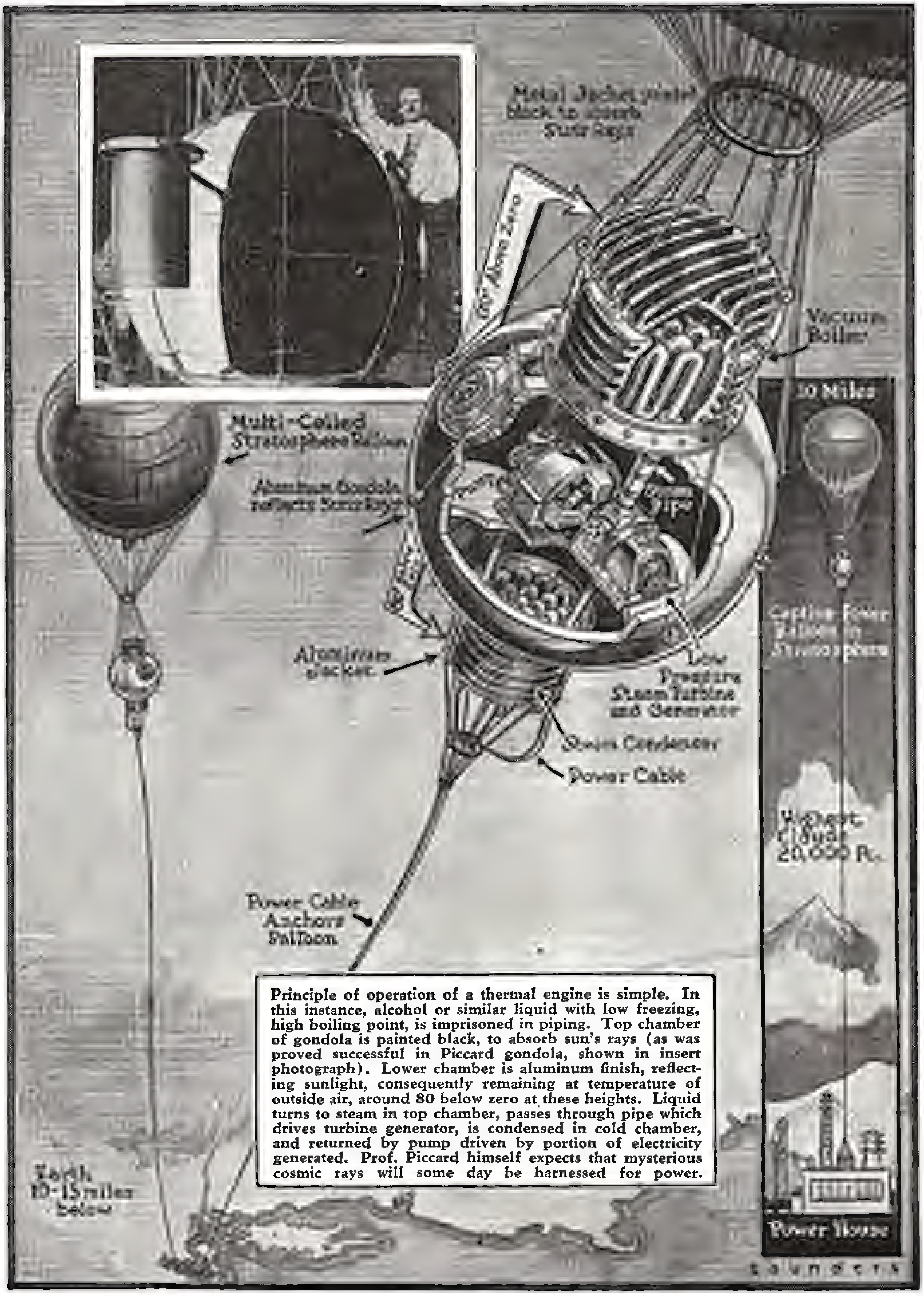
Another idea, less close to realization than Volf's windmill but involving natural phenomena just as dependable, partially owes its inception to the stratosphere balloon ascents of Prof. Auguste Piccard. The extremes of temperature encountered by Piccard, in which the outside air was around 75 degrees below zero while interior temperatures of the gondola were around 100 degrees, makes possible the operation of a thermal engine as described in detail on opposite page.


Search lights
Wind blades on three sides
Height 30 feet
Wind driven shaft geared to generator
Generator



In circle, how three fans are geared to driveshaft in Volf windmill. At right, working model of the design. Cylindrical unit behind fans is a gyro stabilizer which assures smooth running in gusty winds.

POWER *from the* SKIES


Metal Jacket painted black to absorb Sun's Rays
Vacuum Boiler
10 Miles
Multi-Celled Stratosphere Balloon
Aluminum Gondola reflects Sun's Rays
Steam Pipe
Aluminum Jacket
Low Pressure Steam Turbine and Generator
Steam Condenser
Power Cable
Captive Power Balloon in Stratosphere
Highest Clouds 20,000 Ft.
Power Cable Anchors Balloon
Earth 10-15 miles below
Power House
Saunders

Principle of operation of a thermal engine is simple. In this instance, alcohol or similar liquid with low freezing, high boiling point, is imprisoned in piping. Top chamber of gondola is painted black, to absorb sun's rays (as was proved successful in Piccard gondola, shown in insert photograph). Lower chamber is aluminum finish, reflecting sunlight, consequently remaining at temperature of outside air, around 80 below zero at these heights. Liquid turns to steam in top chamber, passes through pipe which drives turbine generator, is condensed in cold chamber, and returned by pump driven by portion of electricity generated. Prof. Piccard himself expects that mysterious cosmic rays will some day be harnessed for power.

This thermal power plant, anchored by captive balloon high above the clouds to operate through heat of sun and cold of atmosphere, is an idea based on sound physical laws, demonstrated in Piccard balloon ascent a year ago.

Anti-Aircraft Machine Gunners Practice on Model Plane

German gunners blazing away at cardboard plane towed across "sky" on cable. Speed is regulated by winding drum.

WITH their fighting equipment drastically restricted by Versailles Treaty, German military experts have devised an ingenious method for giving anti-aircraft machine gunners an opportunity to develop their marksmanship.

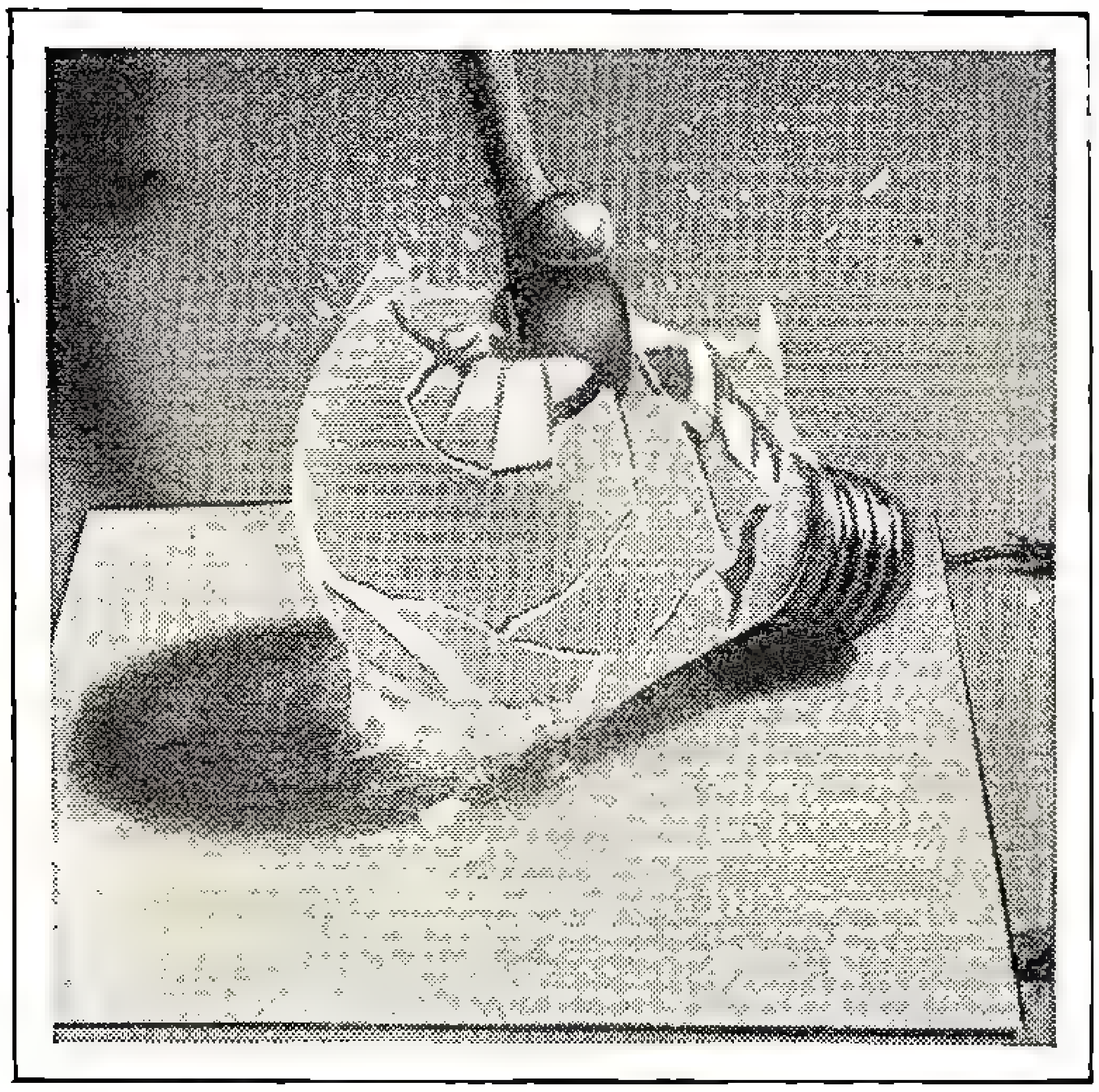
As demonstrated in the photo at the left, a small cardboard plane is drawn across the sky on a cable, the speed being reduced to a scale commensurate with the reduced size of the midget plane.

On the ground, accoutred as in war time, a machine gun crew blazes away, riddling the plane as effectively as its marksmanship will allow. Practice with this method, tests reveal, soon develop the soldiers into crack shots.

Latest in High Speed Photography

SHOWN below is a remarkable photo demonstrating what happens when you shatter an electric light globe. What makes the study possible is an amazing new super-snapshot camera which records impressions more swiftly than the human eye.

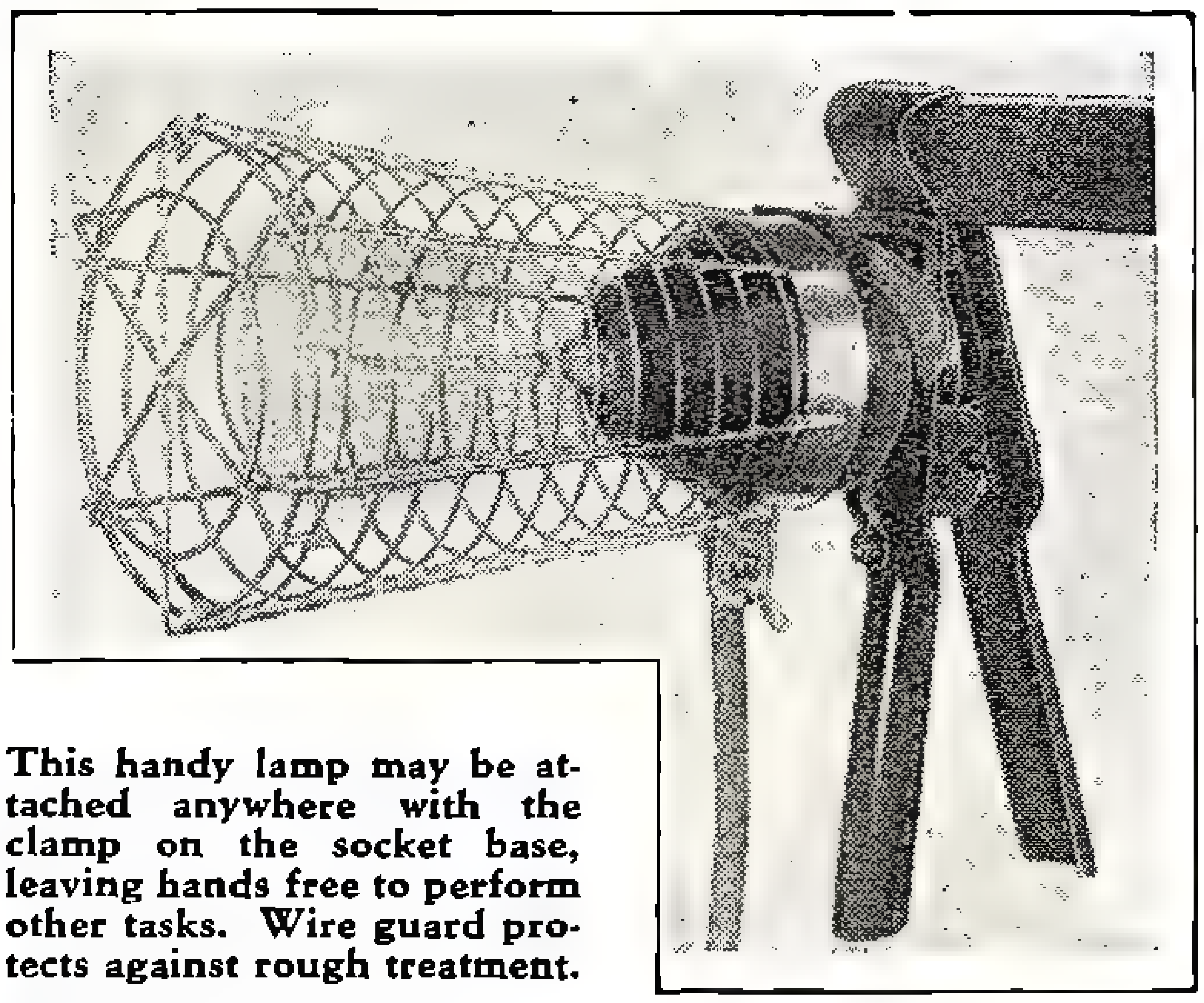
The snapshots are taken at the terrific speed of 4,200 a second, exposures ranging from one one-millionth to one five-hundred-thousandth of a second. The high speed camera was developed at the Massachusetts Institute of Technology.



This photo, taken with high speed camera in one one-millionth second, shows how glass flies when you smash globe.

Handy Lamp Attaches Anywhere

A NEW hand lamp now on the market has a clever gripping device which makes it possible to attach the globe almost anywhere, leaving both your hands free to do the work. It can be adjusted so that the lamp hangs perpendicular, regardless of the angle of the gripping device. A wire guard protects the bulb against rough treatment.



This handy lamp may be attached anywhere with the clamp on the socket base, leaving hands free to perform other tasks. Wire guard protects against rough treatment.

Diatoms Make Sea a Soup for Fish

THE most important creatures of the sea are not the gigantic whales or the ferocious sharks, but are tiny plantlets called diatoms, so small that more than a hundred of them can lie side by side on a pinhead but so numerous that they convert the surface water of the whole ocean into a kind of thin vegetable soup which then supports all the other sea creatures, even the whales and the sharks.

Each living diatom contains a tiny oil droplet, constituting from one-fifth to one-half of the plantlet's bulk. This oil is produced, just as are olive oil and cottonseed oil on land, by the chemical process called photosynthesis. The tiny sea plants absorb sunlight and use this energy to manufacture new chemical materials from water,

Novel Buoy Permits Swimmers to Sit or Walk on Water

WHEN Miss Marcelle Edwards. former "Follies" beauty, took her initial dip at Palm Springs, California, recently, she introduced a novel floating device which enabled her to sit comfortably on the surface of the pool or actually to walk through the water by moving her legs.

The water walking device consists of an inflated bag shaped like a doughnut, as illustrated in the photo, and strapped to the back with a leather harness. Inflation is effected with an ordinary tire pump, or even a pair of hefty lungs.

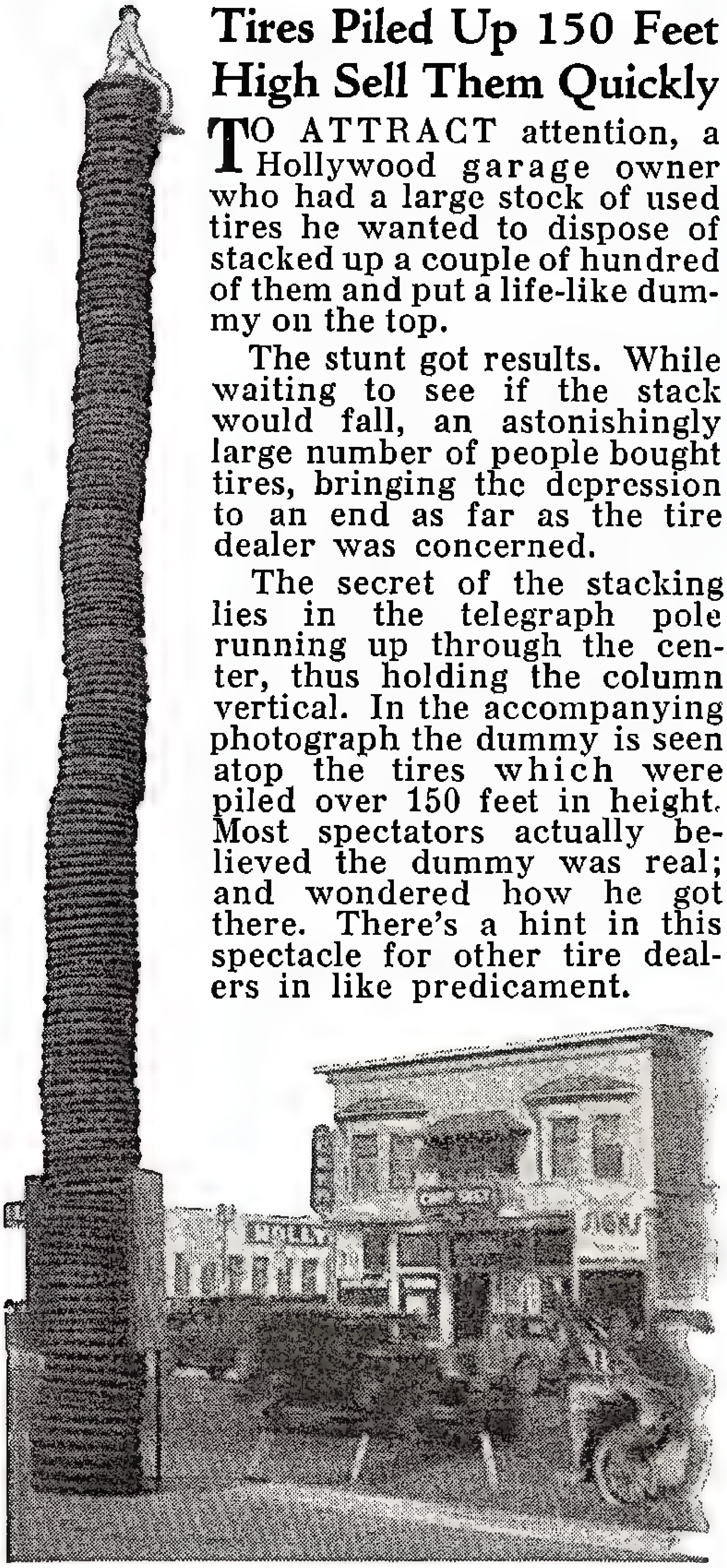
When not in use the air can be exhausted as in an auto or bike tire, so that the gadget can easily be transported. Ideal also for floating lazily in the sun-warmed water.

Tires Piled Up 150 Feet High Sell Them Quickly

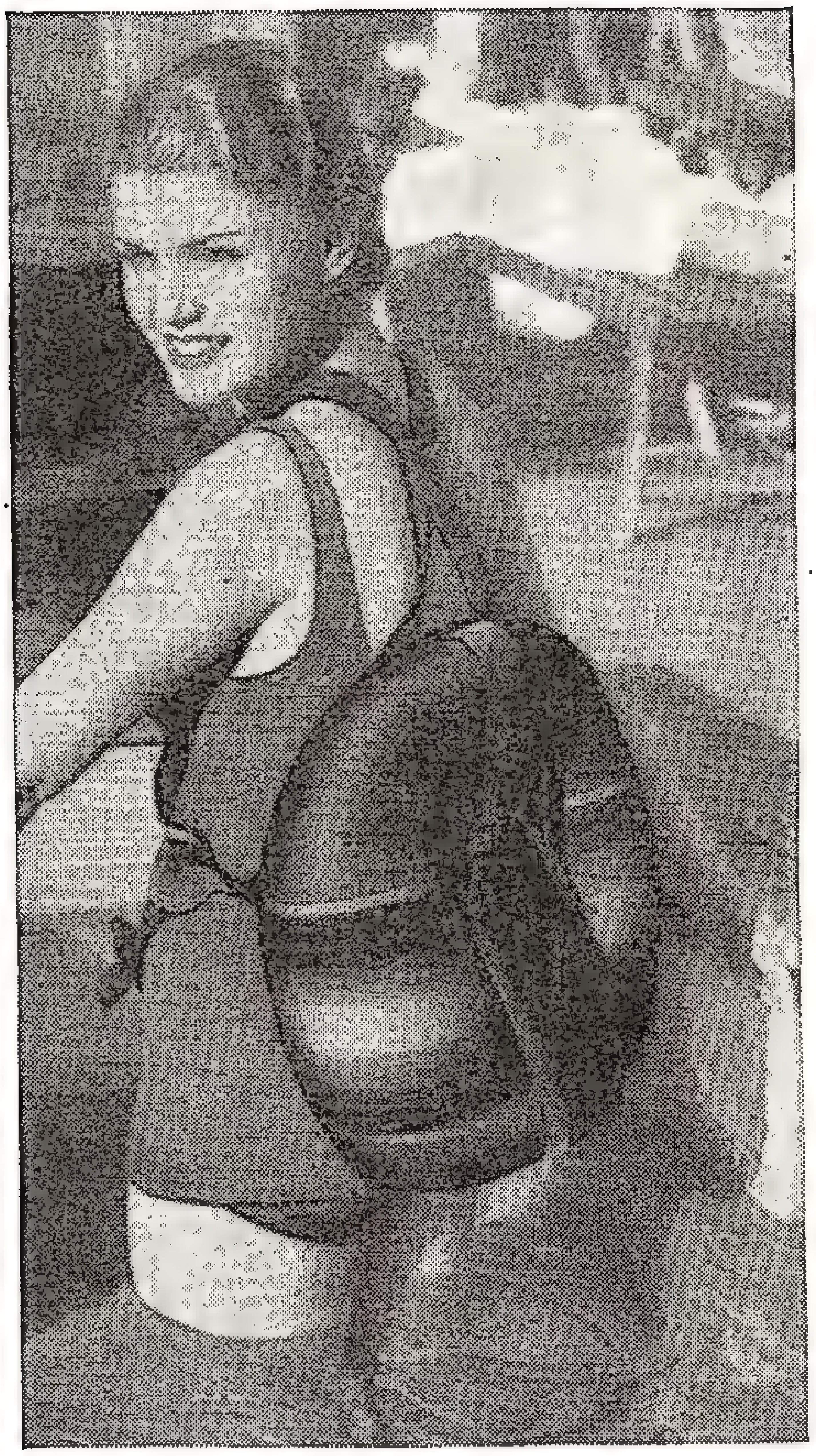
TO ATTRACT attention, a Hollywood garage owner who had a large stock of used tires he wanted to dispose of stacked up a couple of hundred of them and put a life-like dummy on the top.

The stunt got results. While waiting to see if the stack would fall, an astonishingly large number of people bought tires, bringing the depression to an end as far as the tire dealer was concerned.

The secret of the stacking lies in the telegraph pole running up through the center, thus holding the column vertical. In the accompanying photograph the dummy is seen atop the tires which were piled over 150 feet in height. Most spectators actually believed the dummy was real; and wondered how he got there. There's a hint in this spectacle for other tire dealers in like predicament.



This attention getting stunt—used tires piled up 150 feet high, surmounted by dummy—solved depression for dealer.



Here is fair bather at Palm Springs, Calif., wearing floats which permit her to sit on water or walk partly submerged.

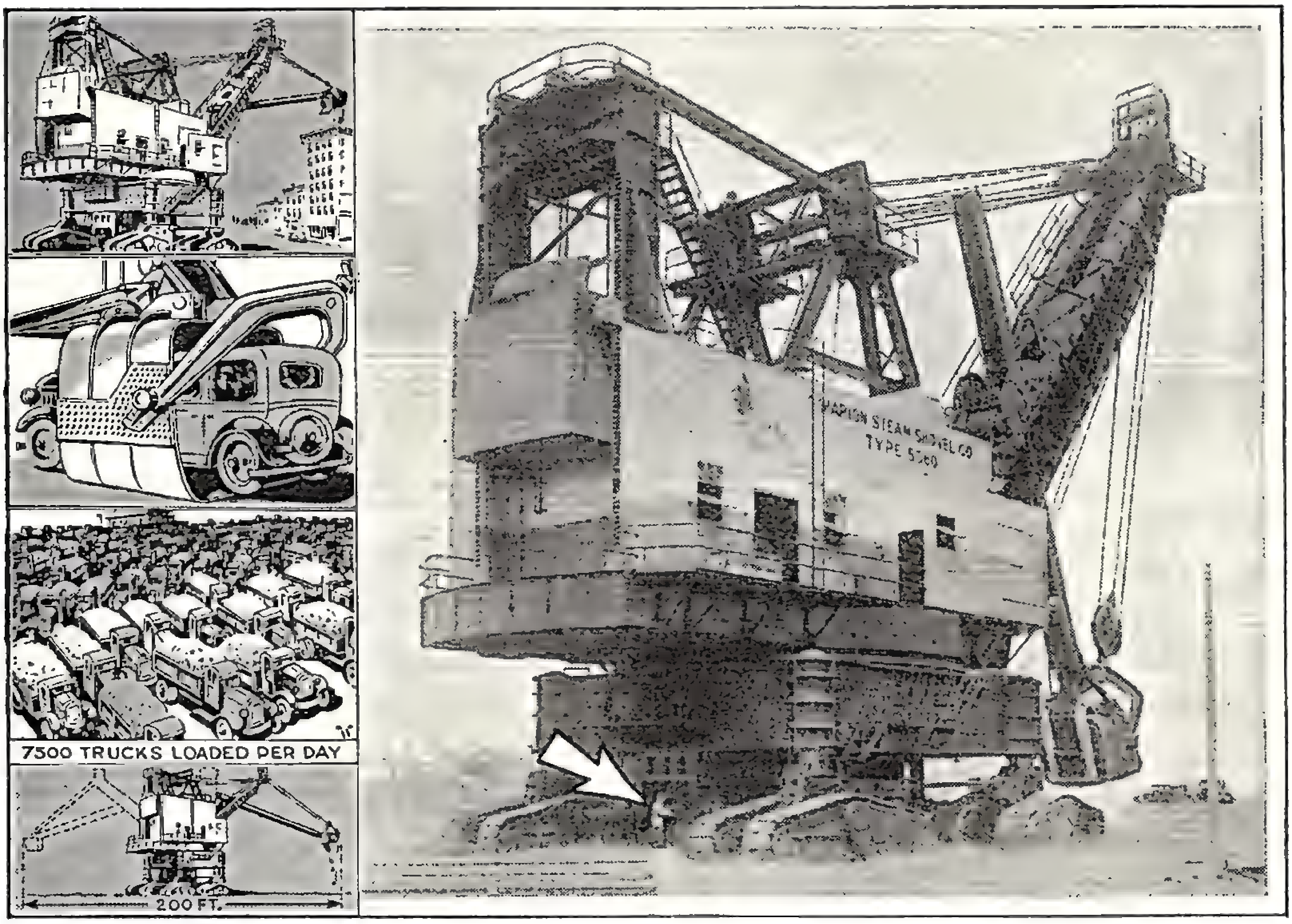
Colored Tires Match Your Car

THE use of colored auto tires to harmonize with the body color scheme, an event long desired by many fastidious motorists, has been made possible by the developments of a prominent tire manufacturer.

Exhaustive experiments were required to produce these tires because of the destructive effect sun and weather have on color. The sidewall of the casing has a mottled effect, thus making many color combinations possible. The tread is so impregnated with the color pigments that color is never lost even after thousands of miles.

Something new for motorists—colored tires to harmonize with body of your new automobile. The sides have mottled effect while the tread is solid color.

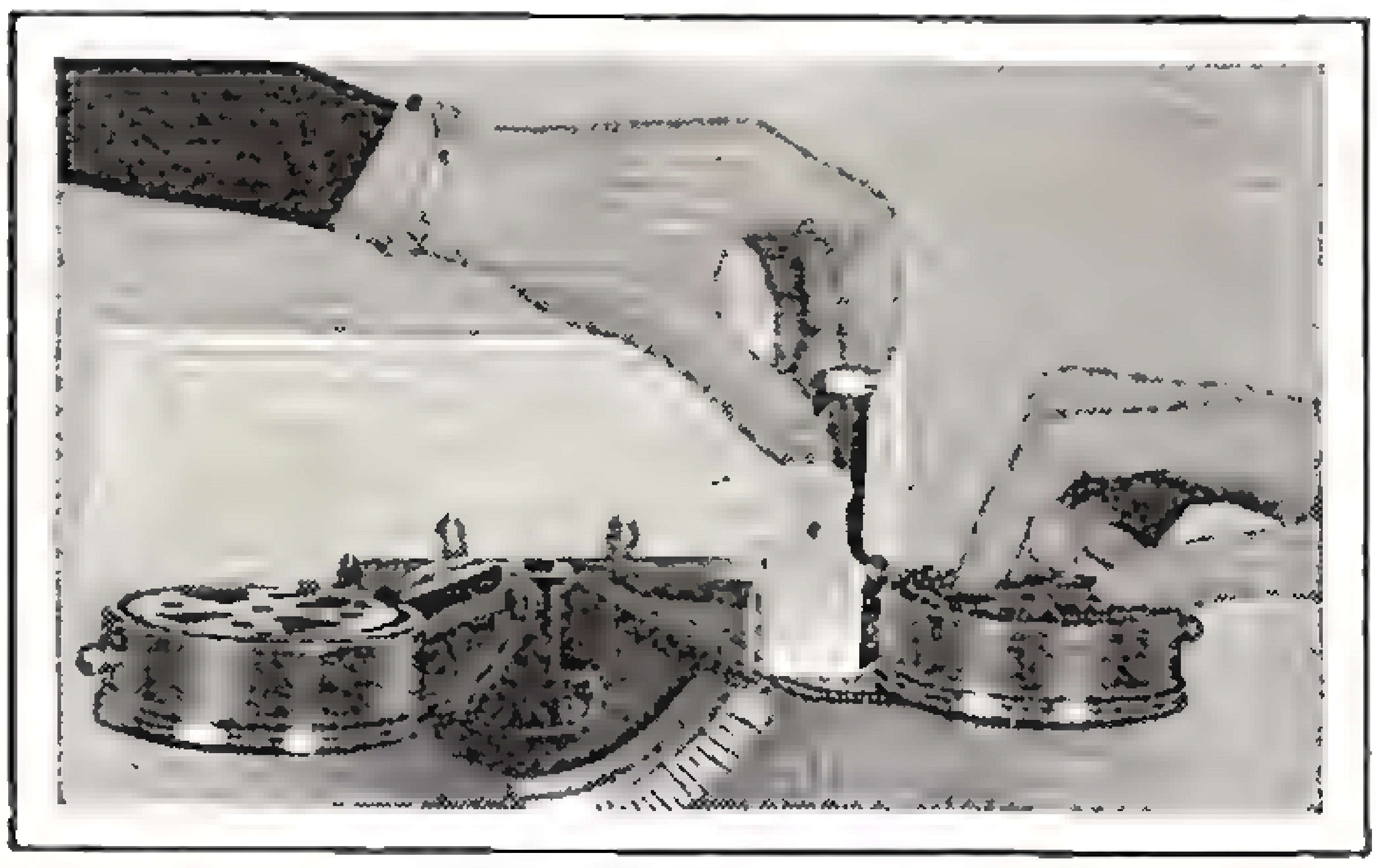
Electric Shovel is Mechanical MONSTER



Enormous size of this electric excavator may be realized by comparing with it the man pointed out by the arrow. Its huge shovel will pick up 18 cubic yards of dirt and deposit its load 200 feet away on top of a seven story building.

Device Renews Typewriter Ribbon

A SIMPLE device, which can be operated by any stenographer, is said to make new typewriter ribbons out of old ones, and to reduce the average wear of ribbons by about 80%. The device injects a solvent evenly throughout the old ribbon and is rapidly applied by winding the ribbon from one reel to the other. The device is refilled with solvent from time to time as needed, and can also be used to renew ribbons on bookkeeping and adding machines.



Typewriter, bookkeeping and adding machine ribbons are renewed by this new device which applies solvent to the cloth as demonstrated. Reduces average wear 80 per cent.

A NEW monster in the mechanical world has made its appearance in the form of an electric excavation shovel of almost incredibly gigantic dimensions.

Shown above, the shovel has a dipper that will scoop up 18 cubic yards of dirt at one sweep, and will dig enough in a 24-hour day to fill 7,500 motor trucks of 4 yards each. A seven-passenger car can be driven through the dipper with room to spare.

The enormous reach of the shovel is illustrated in the fact that it can pick up a dipper full of earth, rotate, and dump it 200 feet away on the top of a seven-story building.

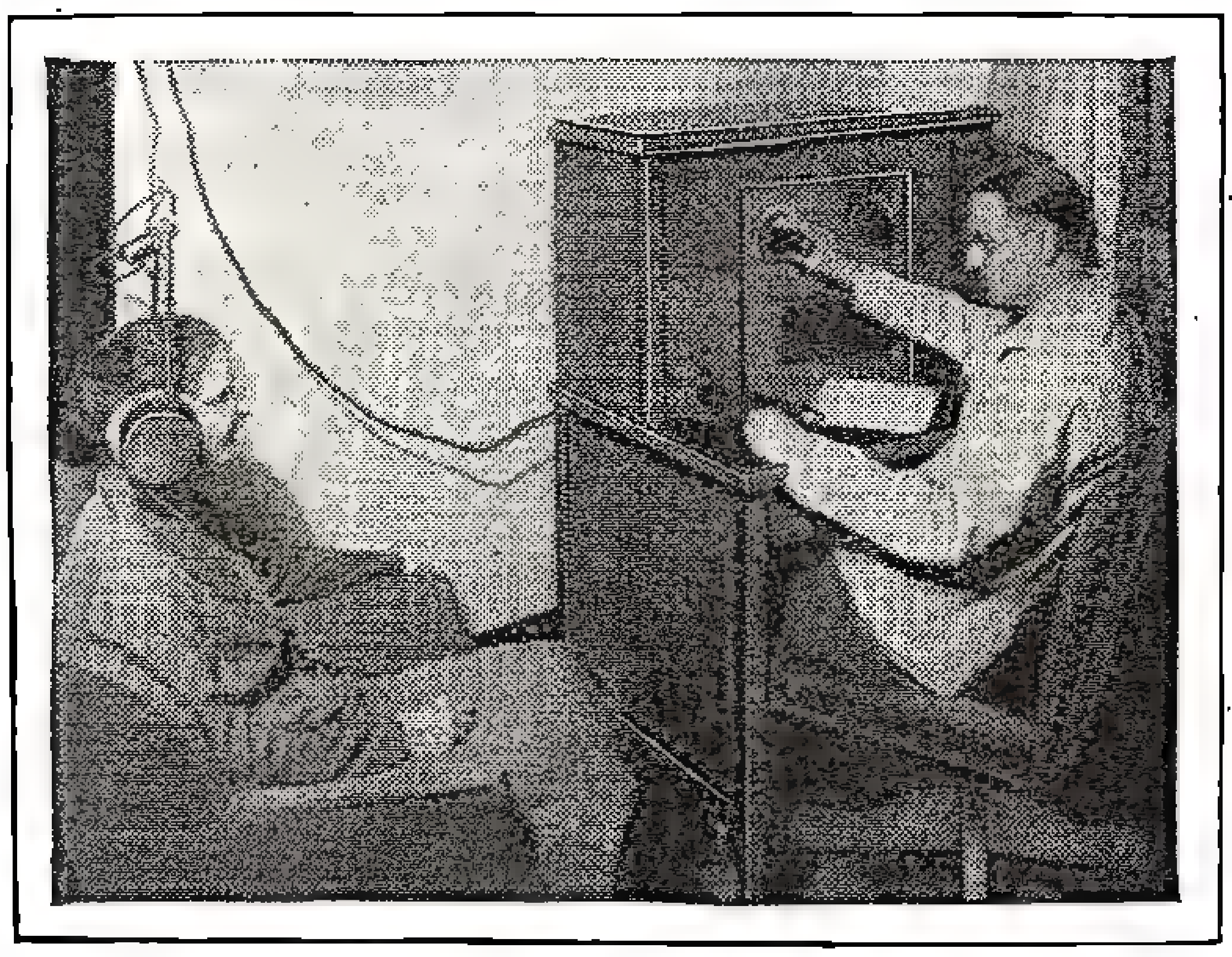
Strange Facts About Explosions

HOW human senses may play their owner false in emergencies is evidenced by the report of a British miner who happened recently to be in the very middle of a mine explosion, yet survived and was conscious chiefly of a lot of coal dust in his mouth, without perceiving or remembering the blast of fire which burned him severely. Evidently the mental shock was so great that the burns were not felt until afterward. Only the strange experience of a mouth inexplicably full of coal dust was remembered.

Ear Gymnasium Exercises Diaphragm to Restore Hearing

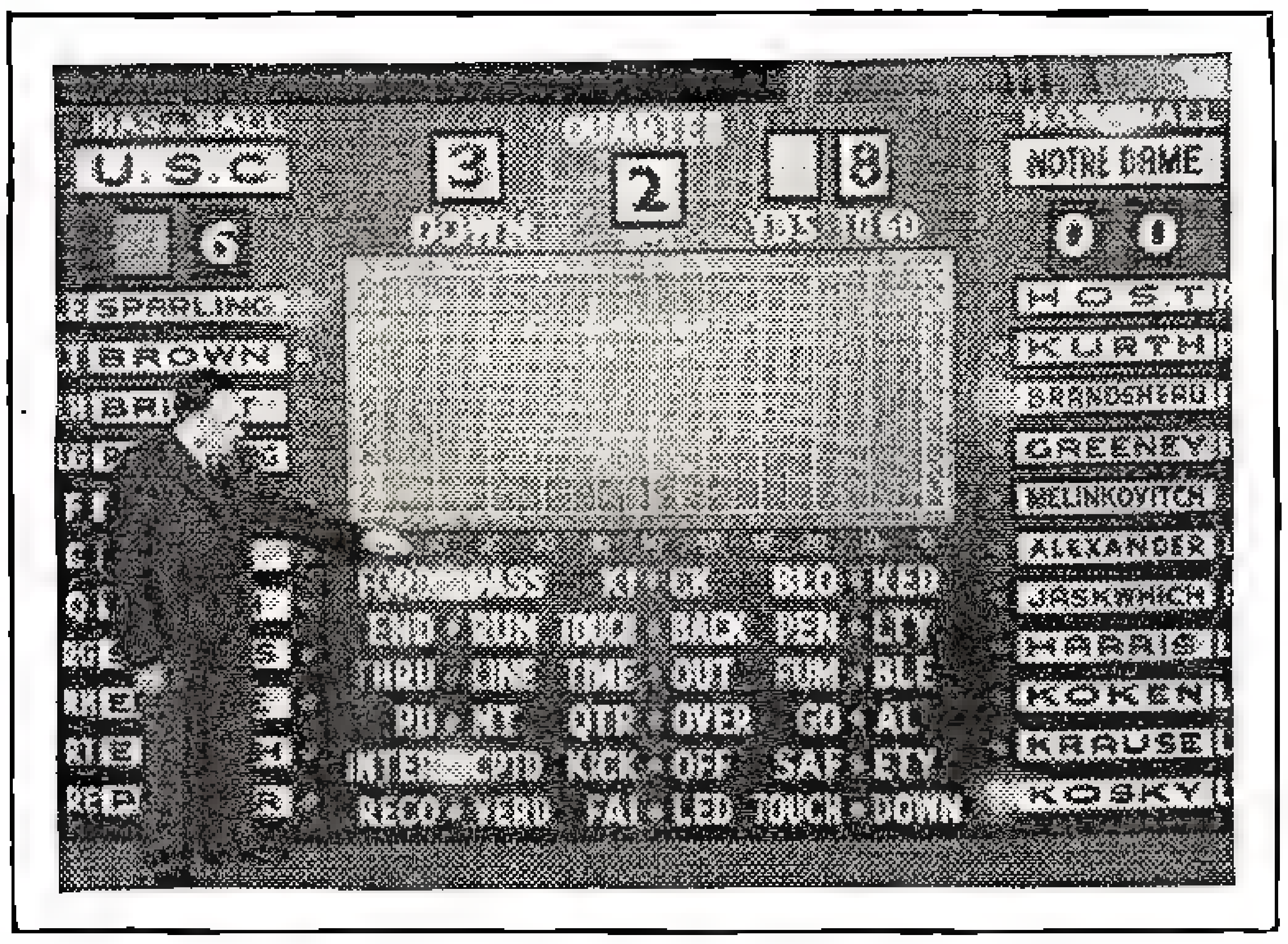
RESTORATION of hearing has been accomplished in more than 300 cases with a new device producing controlled tonal vibrations. The "ear gymnasium," or Auratone, as the device is called, is used to maintain, over the various bands of frequencies in which the subject is hard of hearing, a volume at which a sensation can be perceived in the ear. Thus, inactive parts of the ear are aroused and re-educated, while hearing is strengthened.

Tones are produced by an audio oscillator generator. Advantages of the device are found in exercising those parts of the ear which are partially deaf to sound.



Audio oscillator of the "Auratone" at right generates vibrations in phones to exercise insensitive diaphragm of ear and restore hearing to the deaf and partially deaf.

Board Reproduces Football Game



Spectators watching this scoreboard can follow football game play by play. Names of players are flashed on panels, while ball moves on grid according to original moves.

AN ingenious "grid-graph" foot ball scoreboard recently displayed at a Los Angeles inventor's exhibit scores the games, and shows the personnel of each play by flashing lights as well as diagramming it in lights on a gridiron as the play is made.

The board can be operated at any point by direct wire from the field to practically replay the game. Spectators at remote points can watch the actual motion of the ball on the field, which is shown by a light that indicates the moves of the pigskin.

New Streets to Stop Traffic Jams

OUR antiquated system of street corners, inherited from the horse and buggy days, is blamed by a prominent traffic expert for the majority of traffic accidents and delays. The ordinary type of level, right-angled crossing at the street corners do not have anything like the traffic capacity of the streets themselves; hence the congestions.

Continuous movement of traffic would increase street capacity enormously. One proposed solution to the problem is two-level crossings, such as is found on railroad lines. This would eliminate the stop-and-go system of traffic control which halts traffic all too often.

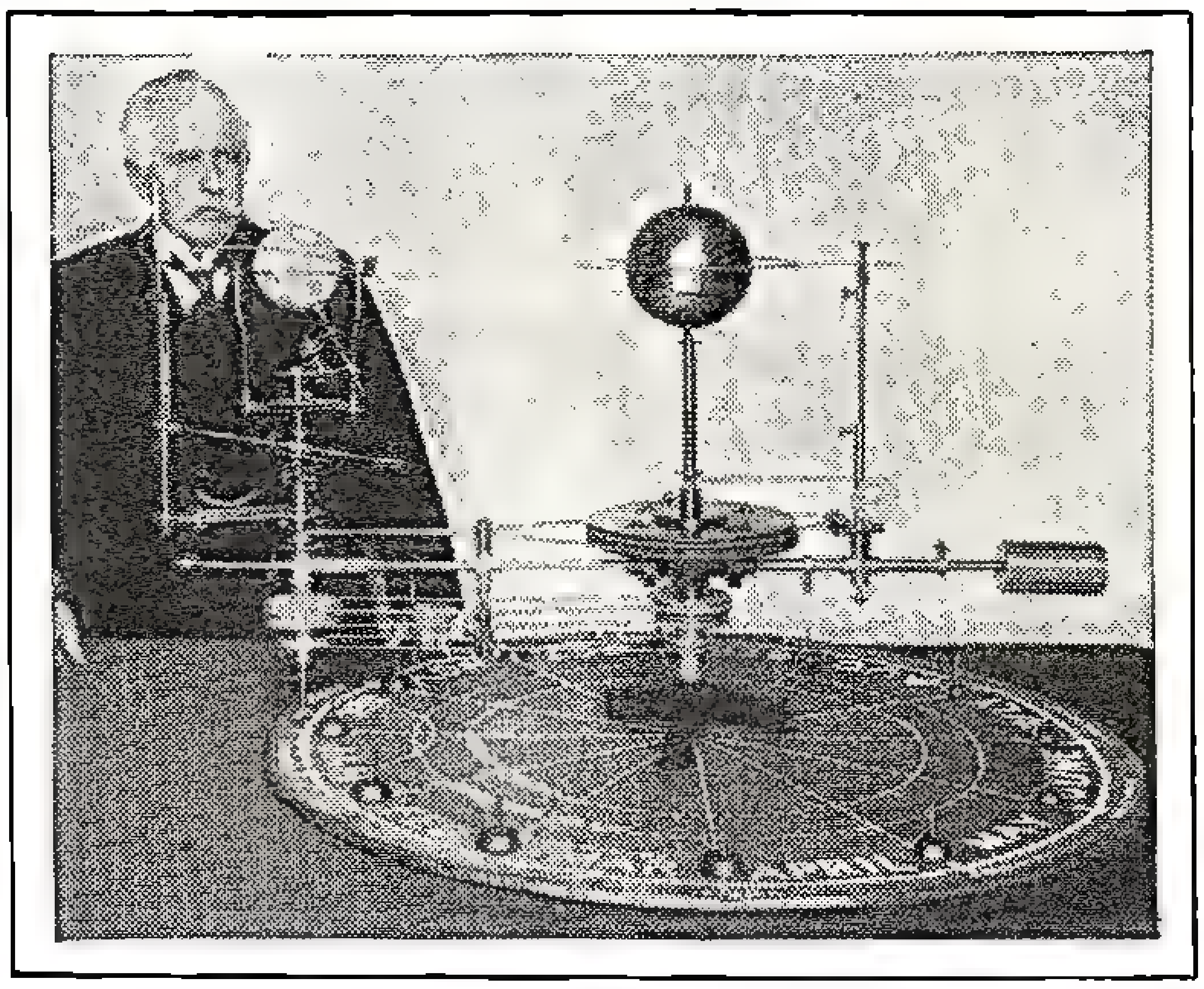
Condemns "Frills" in Education

REVISION of public school systems to include only a limited number of essentials and to leave out many of the "frills" now taught is advocated by the distinguished South African educator, Professor H. B. Fantham. The only real educational essentials, Prof. Fantham believes, are reading, writing, arithmetic, the language of the country, a little history, some economic and human geography, biology, a brief outline of other sciences, and some art.

Planet Model Is Machine Marvel

ONE of the most remarkable pieces of mechanism in the world is a working model of the sun, moon, and earth, which is on display in a famous planetarium.

Shown below, the model duplicates with perfect fidelity the relative motions of the celestial bodies, reproducing the daily rotation of the earth and its daily revolution around the sun, the monthly revolution of the moon around the earth, and the sun's rotation on its axis. Crank operates mechanism.



Relative motions of sun, earth and moon are reproduced on this amazing working model, which accurately predicts forthcoming eclipses, solar and lunar, twenty years ahead.

When You've Found Gold—

Sluicing methods have not changed radically from early days. This photo, taken in the sixties near Central City, Colorado, shows a group of miners shoveling pay dirt into a sluice fundamentally identical to those in use today for hand operations.

EDITOR'S NOTE: *This is the second of a series of articles on prospecting and recovery methods used in the new gold rush. The first article, which appeared in the April issue of Modern Mechanix and Inventions, described methods of locating paying gold deposits.*

YOU have found gold!

But the ground is not rich enough to make wages by hand panning. Still, if you could handle two yards instead of a half yard, you would make good wages. You keep on testing with the pan to see how much placer ground you have found and how rich it may be.

As you do this you keep your pan clean, especially free from grease, and you have picked out a number of particles of placer gold large enough to be handled with a fine pair of tweezers. The finer concentrates you keep separately to be refined or you have amalgamated them with "quick" (mercury) and will send them to some metallurgist. You cannot risk the poison fumes of the mercury or you might do the refining of the amalgam yourself.

There is one way you can do this without much danger and with small quantities of

Dredges enable gold to be recovered at a profit from placers too poor to be worked by hand. Dirt as poor as 15 cents to the ton returns a handsome profit through use of dredges like this. Of course, deposit has to be of considerable extent. Capital can be interested to the extent of supplying dredges if the prospector can prove the productivity of his placer field on the basis of test borings extending clear down to bedrock. Thousands of tons are handled per day in this manner.

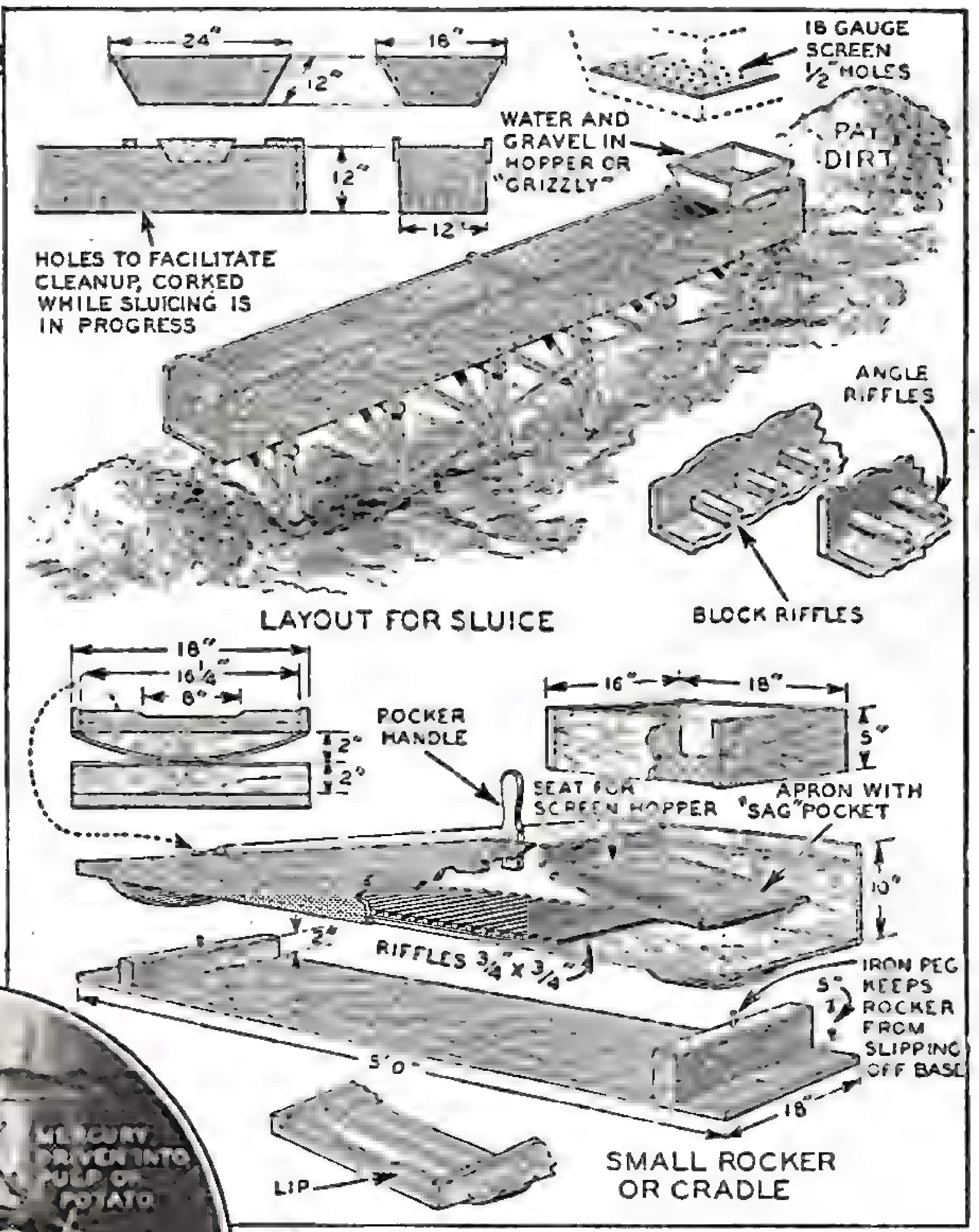
SLUICE 'er OUT!

by Arthur Hawthorne Carhart

amalgam. By putting the amalgam inside a big raw potato, then baking it in a fire outdoors, until well done, the mercury will be driven out into the potato pulp, leaving a button of gold. Unwire the potato, put away the gold, squeeze the mercury out of the cooked potato by hand, using a basin of water to help the separation.

But all your panning has shown you must increase your efficiency, handle four to six times as much earth per man per day, if you are going to make wages. How to do it!

The actual business of working placers ranges from the hand panning of very rich, limited pockets to expensive dredges that cost several hundred thousand dollars, but operate profitably in low grade dirt. More recently there are "placer machines" costing from $200 to $30,000 that handle low grade dirt to advantage. Right off you say you are not interested in any such bulk-handling machinery. But if you have located a big


24"
16"
12"
18 GAUGE SCREEN ½" HOLES
WATER AND GRAVEL IN HOPPER OR "GRIZZLY"
PAY DIRT
12"
12"
HOLES TO FACILITATE CLEANUP, CORKED WHILE SLUICING IS IN PROGRESS
ANGLE RIFFLES
LAYOUT FOR SLUICE
BLOCK RIFFLES
18"
16¼"
8"
2"
2"
ROCKER HANDLE
16"
18"
5"
SEAT FOR SCREEN HOPPER
APRON WITH "SAG" POCKET
10"
2"
RIFFLES ¾" x ¾"
IRON PEG KEEPS ROCKER FROM SLIPPING OFF BASE
5"
5'0"
18"
LIP
SMALL ROCKER OR CRADLE

Construction of a sluice and details of a rocker or cradle are given in the drawing. Gold amalgamated with mercury is recovered by putting inside a potato; heat will drive mercury into pulp, leaving gold for recovery.

MERCURY DRIVEN INTO PULP OF POTATO

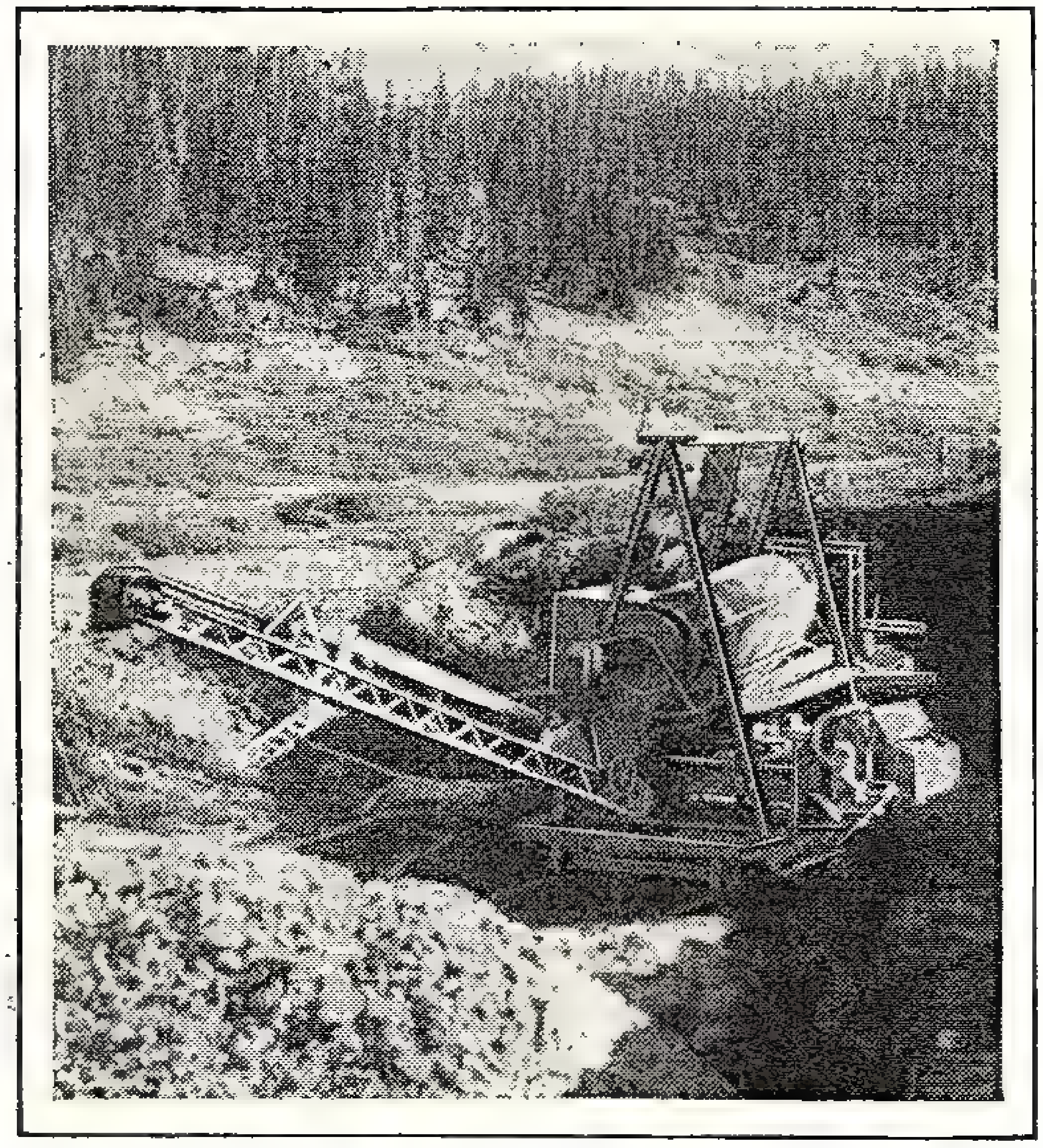
Compare the gold rush of 1932, pictured in the photo above, with the photograph of the fifty-niners at work on the opposite page. Man power plus pay dirt plus a knowledge of the tricks of the trade, wins a living wage for hundreds of present-day prospectors who are combing gold-bearing territories. And there's always possibility of scoring a ten-strike. When intending to try their luck in the field they should know how to identify gold when they have found it, and how to recover it profitably when found—information which is all contained in this interesting series of articles.

Sluice, Rocker and Long Tom Adapted to Different Operating Conditions

placer running from 15c to 25c per ton, and cannot work it yourself by any small means, you might be able to interest someone with capital to work that placer with a machine on shares, provided you had gone over that placer, surveying it to bedrock in many spots, and could show that it was a machine proposition. So, do not turn aside from a placer that shows low values if that placer is big in extent. It may make you far more money than any small, rich placer you might find.

But suppose, now, that we have found a few acres of fairly fat bench, overlooked in early days, running around $2 per yard. By handling two yards per day per man you can make grub money and a fair margin. An occasional nugget in the day's clean-up will boost the total. All right, let's go!

First we must have water that can be ditched to your placer. If you have a "dry placer," deposited by waters long since gone, you have a different and difficult proposition. But with even a little water we can rig up an outfit to wash out our gold. Even a stream that runs only through early summer will help.



Here is a type of gold machine for medium-scale production which fits into the picture somewhere between the individual placer miner and the huge dredge outfit. It's used in deposits too thin to warrant hand methods, not extensive enough to justify a dredge.

Rough lumber, nails, common carpenter's tools, and we are ready to build a sluice.

The Riffle Principle

The sluice is a straight-sided trough, with cleats or "riffles" across the bottom. It is set at a grade sufficient to wash lighter gravel right through the trough while heavier mineral sinks, lodges back of a riffle, and is recovered. At the end of the day, clean-up time, riffles are spooned out, after which concentrates can be further washed in hand panning, or "quick" is used to produce an amalgam with finer gold.

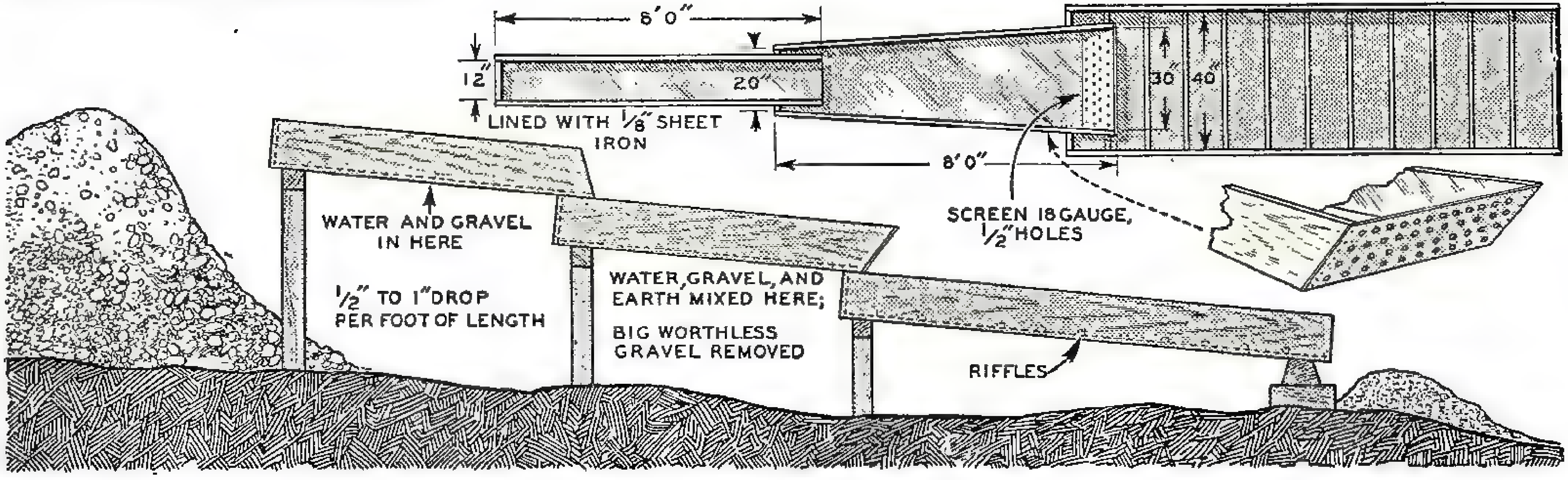
Riffles are of 1 x 1's, or of angle iron, or poles, or rocks of an inch or two in diameter are packed in the bottom of the sluice. The thing required of the riffle is to form pockets holding back heavy mineral that sinks. To be effective there must be a "boil" created to prevent heavy sand packing in and filling the riffle, to produce a washing motion that will sort gold into the bottom, but not enough to wash out finer gold.

The size of the gold particles, the type of earth washed, the volume of water, the type of riffles, determines the grade from the upper to the lower end, and the amount of "boil" required. If water is limited a steep slope will handle a greater amount of earth. Swift water spread out thin will catch fine gold better than deep water. The usual pitch of a sluice is from ½" to 1" per lineal foot. Water required for a sluice varies from 3,500 to 8,000 gallons of water per cubic yard of earth handled.

Materials of the Sluice

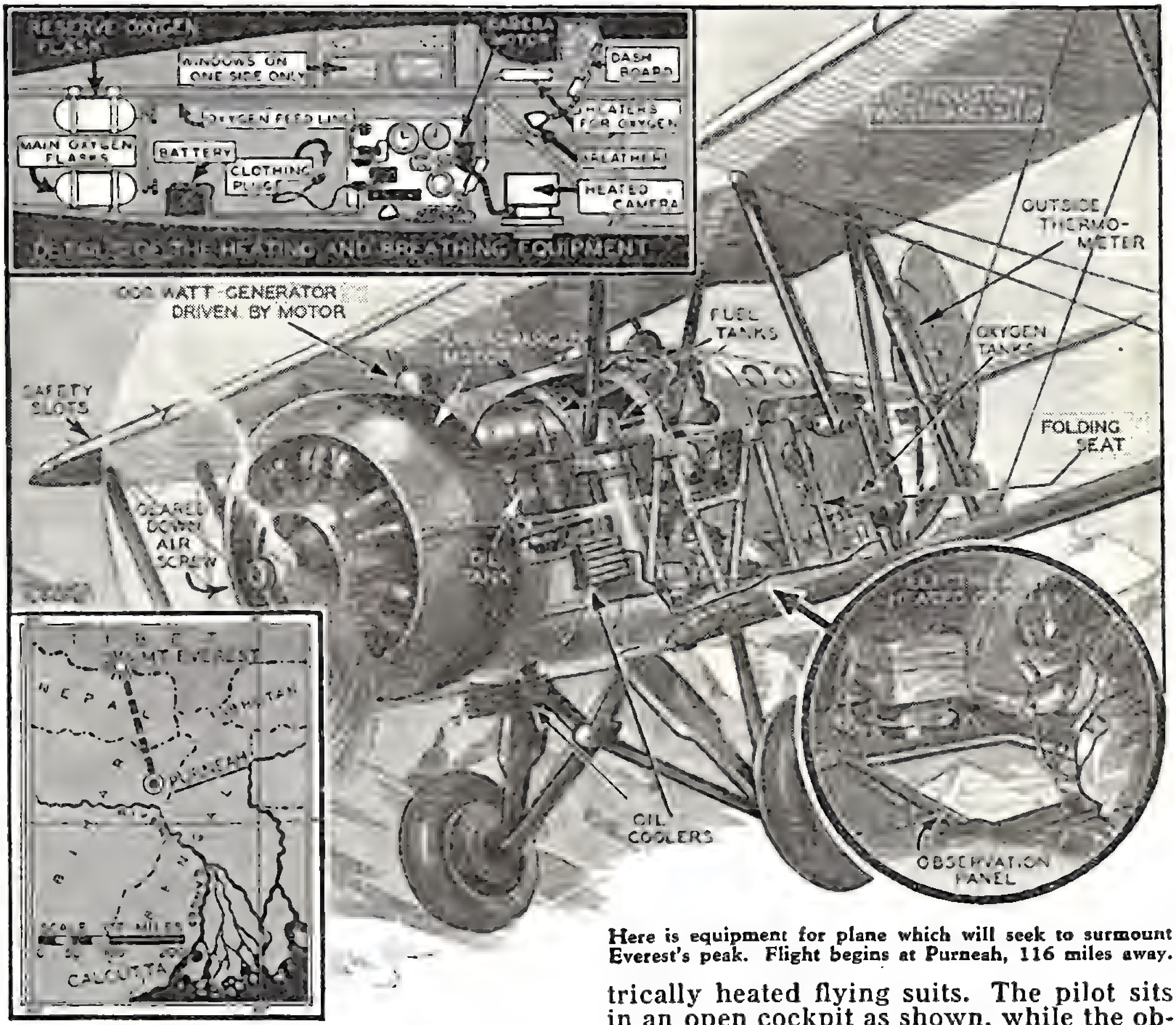
The sluice is made of rough lumber, usually 1" x 12", either in 6' or 12' lengths. Braces across the top of the trough keep it from spreading because of outward pressures. Riffles usually are 1" x 1" or 1" x 1½" cut in length to fit across the bottom of the box, held in place by nails driven through the sides of the sluice, but nails

(Continued on page 135)


6'0"
12'0"
12"
20"
30"
40"
LINED WITH ⅛" SHEET IRON
8'0"
SCREEN 18 GAUGE, ½" HOLES
WATER AND GRAVEL IN HERE
½" TO 1" DROP PER FOOT OF LENGTH
WATER, GRAVEL, AND EARTH MIXED HERE; BIG WORTHLESS GRAVEL REMOVED
RIFFLES

Although sluices are preferred if there is plenty of water handy, the "Long Tom," construction of which is shown above, requires less water and can handle up to six yards per day with two men. Pretty fair wages on dollar gravel.

Everest PLANE Has Unusual Equipment


RESERVE OXYGEN FLASK
WINDOWS ON ONE SIDE ONLY
CAMERA MOTOR
DASH BOARD
OXYGEN FEED LINE
HEATERS FOR OXYGEN
MAIN OXYGEN FLASKS
BATTERY
CLOTHING PLUGS
HEATED CAMERA
DETAILS OF THE HEATING AND BREATHING EQUIPMENT
WATT GENERATOR DRIVEN BY MOTOR
SAFETY SLOTS
GEARED DOWN AIR SCREW
FUEL TANKS
OUTSIDE THERMO-METER
OXYGEN TANKS
FOLDING SEAT
OIL TANK
OIL COOLERS
OBSERVATION PANEL
MT EVEREST
NEPAL
PURNEAH
SCALE MILES
CALCUTTA

Here is equipment for plane which will seek to surmount Everest's peak. Flight begins at Purneah, 116 miles away.

THE formidable Mount Everest, which to this day stands unconquered by man, may soon behold the humiliating spectacle of a mere airplane sailing audaciously over its sky-piercing peak.

The most interesting feature about the forthcoming attempt to surmount the 29,141 ft. peak of Everest is the specially equipped plane which will negotiate the 34,000-ft. altitude demanded in the feat.

As illustrated above, a supercharged Bristol-Pegasus III engine will power the Houston-Westland plane. The air screw, driven through a reduction gear, is so designed that it will not exert full horsepower till a height of 13,000 feet is attained. Through this system, maximum power is available at all altitudes.

An electrically operated and heated camera built into the floor of the observation cockpit will record a 30-mile strip of the mountain country with the help of infra-red photography and clear mountain air.

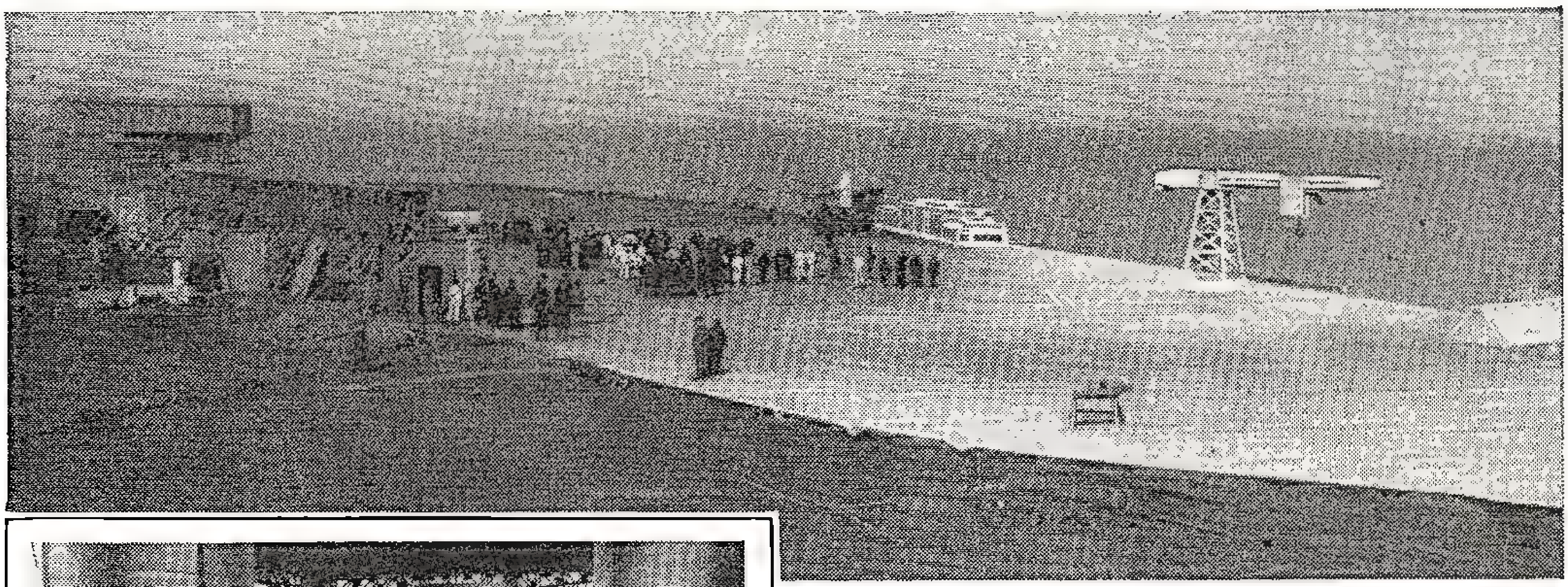
The rarified atmosphere and excessive cold encountered over Everest will necessitate the use of oxygen helmets and electrically heated flying suits. The pilot sits in an open cockpit as shown, while the observer inspects the mountain tops through a glass-covered port in the floor.

Die Recuts Bruised Threads

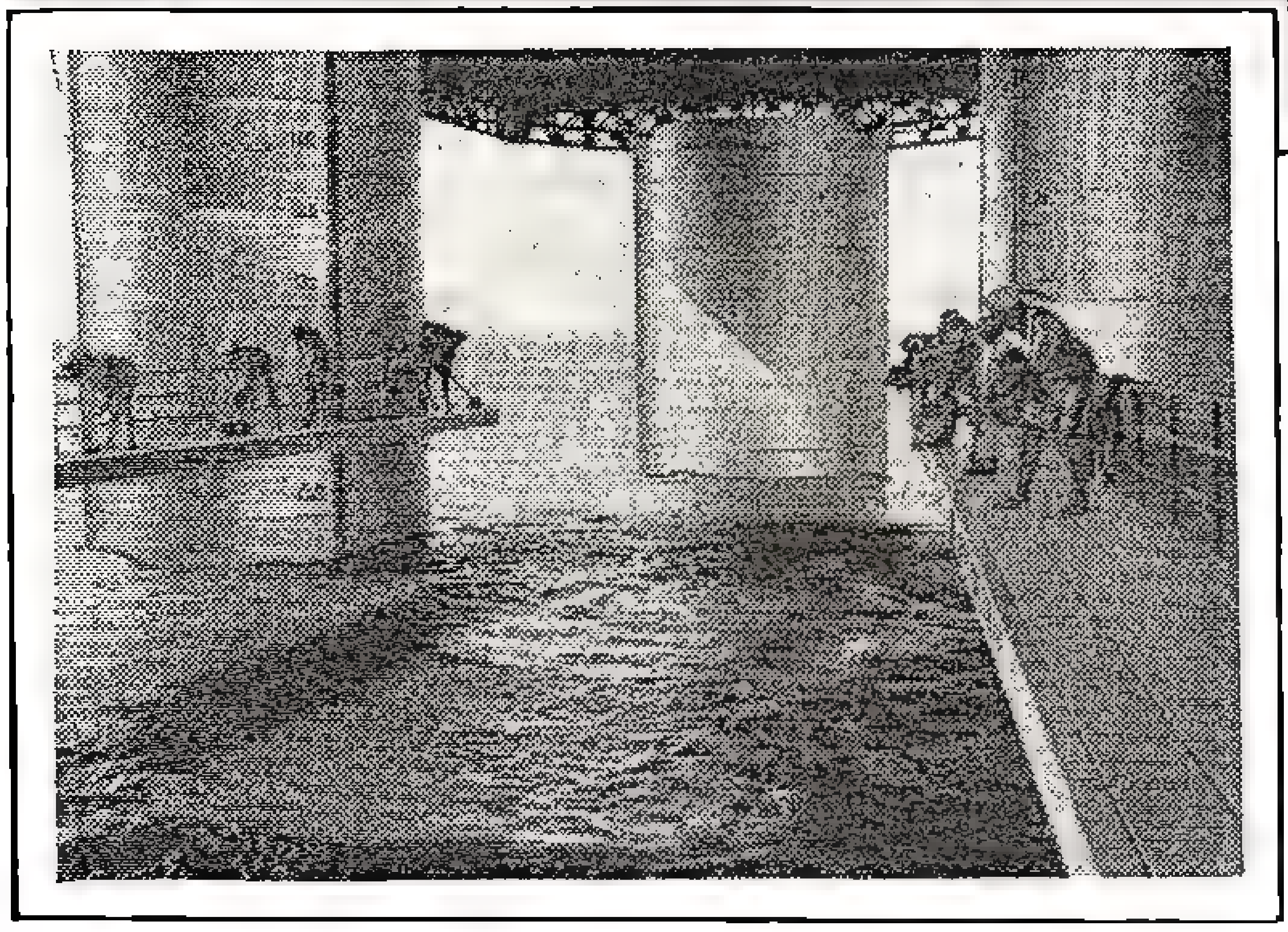
BRUISED and battered threads can now be repaired quickly with a new slip-on re-threading die now being marketed. In use, the die is clamped around the damaged portion as illustrated below. A clean, smooth job is promised, with no cross threads, filing or spoiled parts. The dies resemble round die, cut in half.

Damaged threads are repaired cleanly and quickly with this die, which clamps around battered section, as illustrated.

Movies Submerge FAKE SEADROME



A view of the seadrome looking offshore. When filmed further out the drome appears to be floating in mid-ocean. Note the passenger depot and crane for hauling up planes.



Underside view shows the huge piles which supported the drome platform. Tide rising around these pillars made them appear on the picture to sink, submerging the drome.

A GERMAN film recently produced gave a film realization to the seadrome plans that have long been brewing in the minds of aeronautical engineers.

Although the seadrome was a fake, it had all the features of the genuine article, and illustrated in a highly vivid manner the dangers to which a mid-ocean landing field might be subjected.

The structure, shown in the photos above, was erected on the North Sea coast, with one side resting on the shore, while the other was supported by huge pillars sunk in the water a little offshore. Photo shots were all made in a seaward direction, so that the drome appeared to be floating in mid-ocean. Shots made on the underside of the structure showed the giant pillars to further heighten the illusion.

The scenario called for the submergence of the drome in the ocean when the pillars weakened. This was effected by taking an underside shot when the tide was rising, so that the giant columns appeared to sink down in the water, when in fact the waters were rising about the columns.

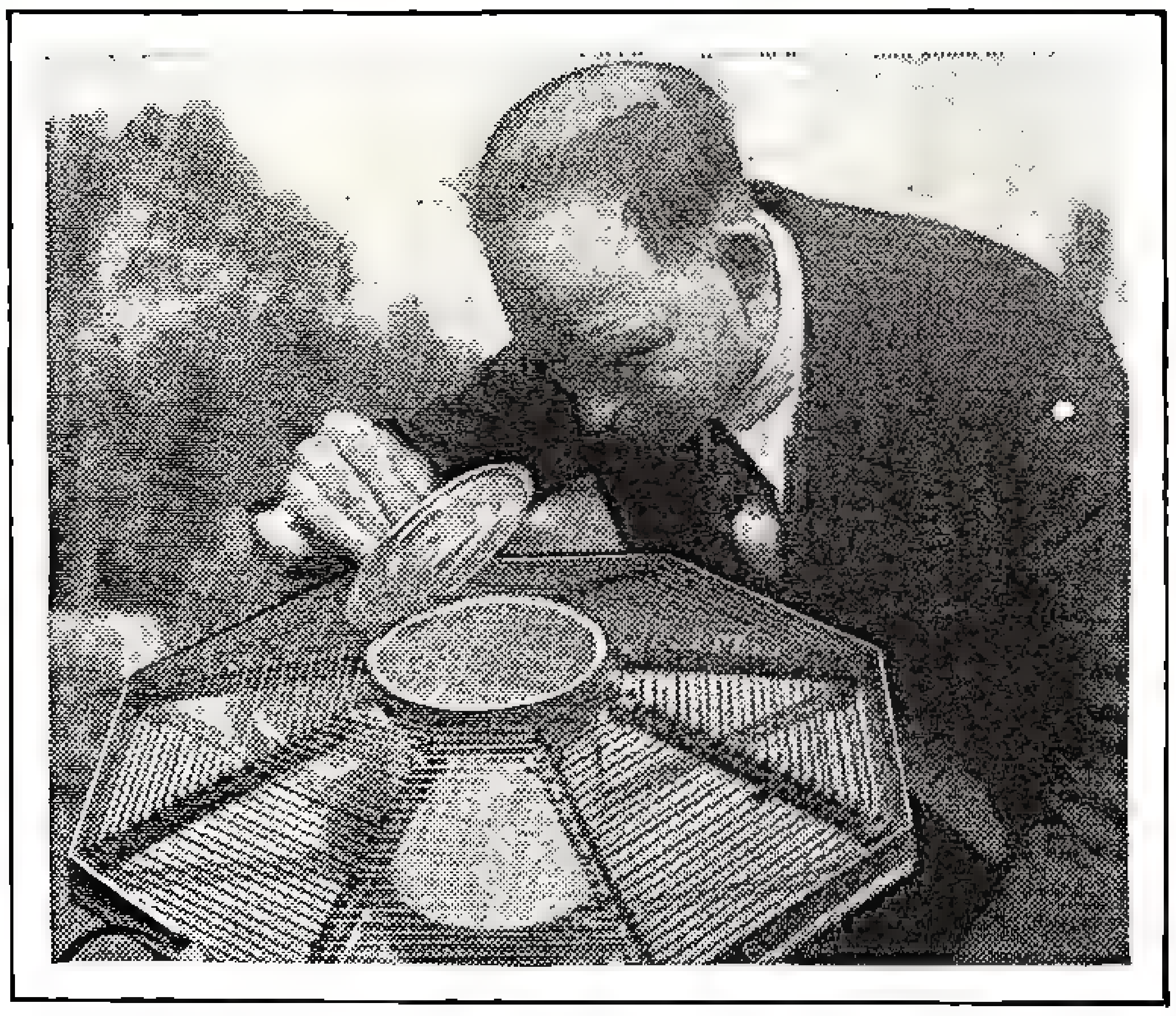
The thrill of the picture was provided by the takeoff of a plane which brought to the scene a steamer that rescued the crew of the drome before it was engulfed.

Fly Trap Plugs Into 110 Volts, Electrocutes All Flies Lighting on Wires

UNKNOWN inventors on the Pacific Coast were recently given an opportunity to display their creations at a patent exhibition in Los Angeles. One of the outstanding items was an electric fly catcher, shown in the photo at the right.

In the center of the contraption is a can which is filled with bait for the unwary flies, and for their accommodation they are provided with a landing field whose surface is a maze of wires. When the flies alight on this field to go for the bait, however, they make the biggest mistake of their lives, for they get a shot of 110 volts through them that immediately renders them defunct.

The trap may be set up anywhere a 110 volt outlet is accessible. While the trap will by no means exterminate the species, it will rid a fair sized room of a nuisance.



Flies lighting on wires of trap are instantly electrocuted.

"Mineral Radio Survey" Machine Hunts for Pirate Gold

EARLY legends of Los Angeles name a spot on a hill near Fort Moore as the place where treasure was buried by bandits and pirates several hundred years ago.

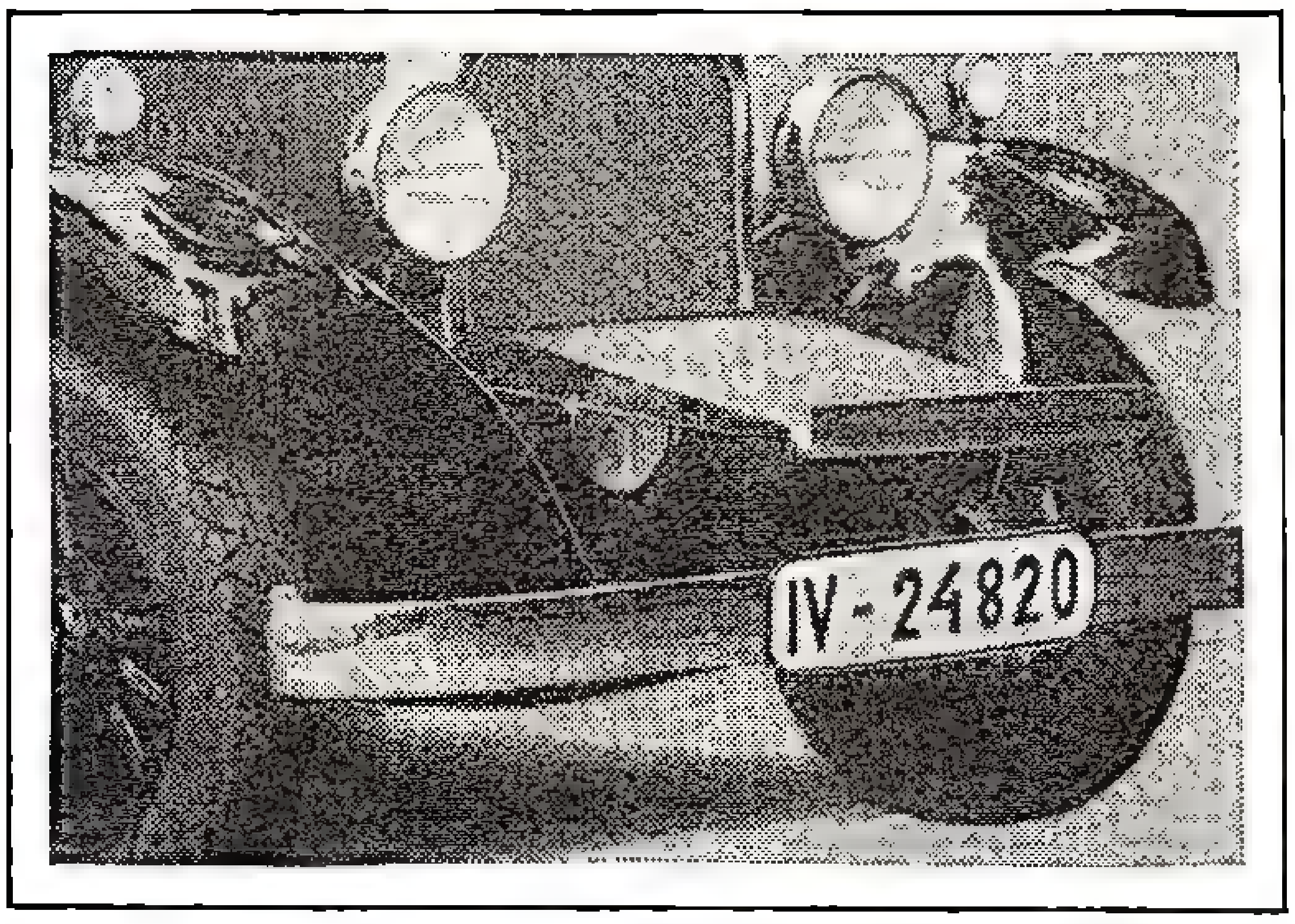
Ray Martinez, of Los Angeles, claims he has in his possession an ancient sheepskin map which shows the position of the gold, and he has interested Rex McCleary, an engineer who has perfected a mineral radio survey machine that, it is claimed, will detect the presence of oil, water or minerals.

Preliminary tests with the treasure finder has lead the inventor to guarantee that gold will be found about 25 to 28 feet below the spot he will point out. No constructional details of the apparatus are available.

Mining engineers searching for buried treasure on Los Angeles hill with mineral radio survey machine which penetrates to depth of 28 feet to disclose presence of metal.

Shades for Auto Lights Cut Glare

A SHADE for automobile headlights recently invented greatly reduces glare and the percentage of accidents resulting therefrom. The shade is drawn out over a set of auxiliary lights by pressing a button on the dash, the procedure being entirely automatic. The device is ideal for city driving.



Shade extending out over auxiliary set of headlights eliminates glare. Operated by special button on dash of car. While driving in cities main headlights are extinguished.

Feed Birds From Window Trays

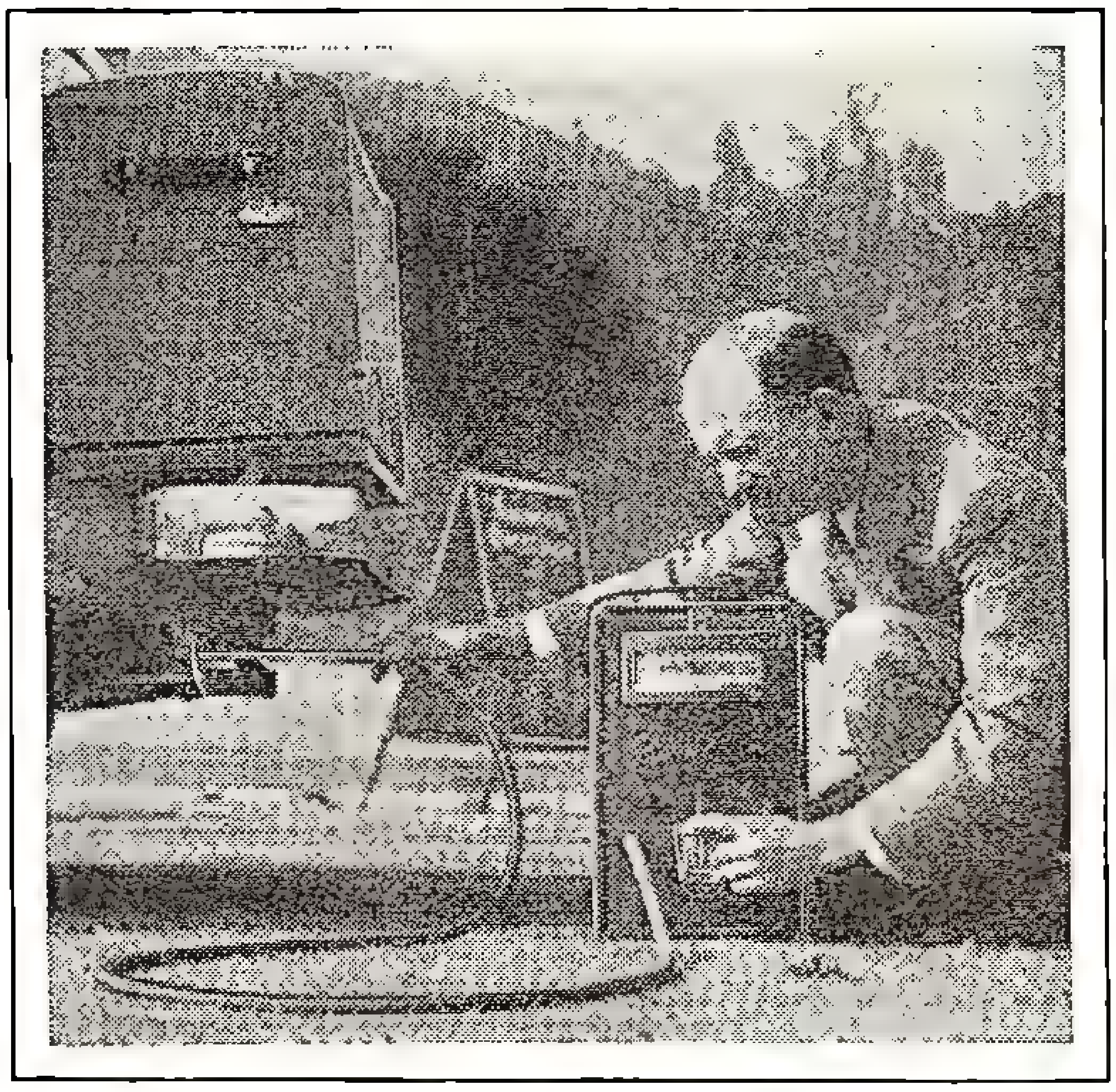
BIRD trays placed outside house windows as attractive resting and feeding places for bird visitors are suggested for amateur nature lovers. A convenient form is described as a shallow wooden box a foot wide by about a foot and a half long, fastened permanently to the window sill.

Inside this box is a tight-fitting but removable tray of metallic zinc, which does not corrode in the weather and which makes the whole device easy to clean. On this zinc tray put a shallow dish of water for the birds and some suitable food, which may be bread crumbs, nuts and small meat bones. Half a cocoanut is another appreciated delicacy.

Meter Analyzes Auto Carburetion

AUTOMOBILE owners can now effect a great saving in gas consumption of their cars, thanks to the invention of an analyzer which reveals at a glance whether gas-air mixture is too lean or too rich.

In the test, a hose connects to the exhaust as demonstrated below. If the mixture is too lean, the pointer swings over to the lean side of the scale; if too rich, to the rich side. A correct mixture can be obtained by adjusting the carburetor while the analyzer is attached to the exhaust.



Meter indicates whether gas-air mixture is too lean or too rich when hose is attached to exhaust of idling motor.

A Complete COAL MINE

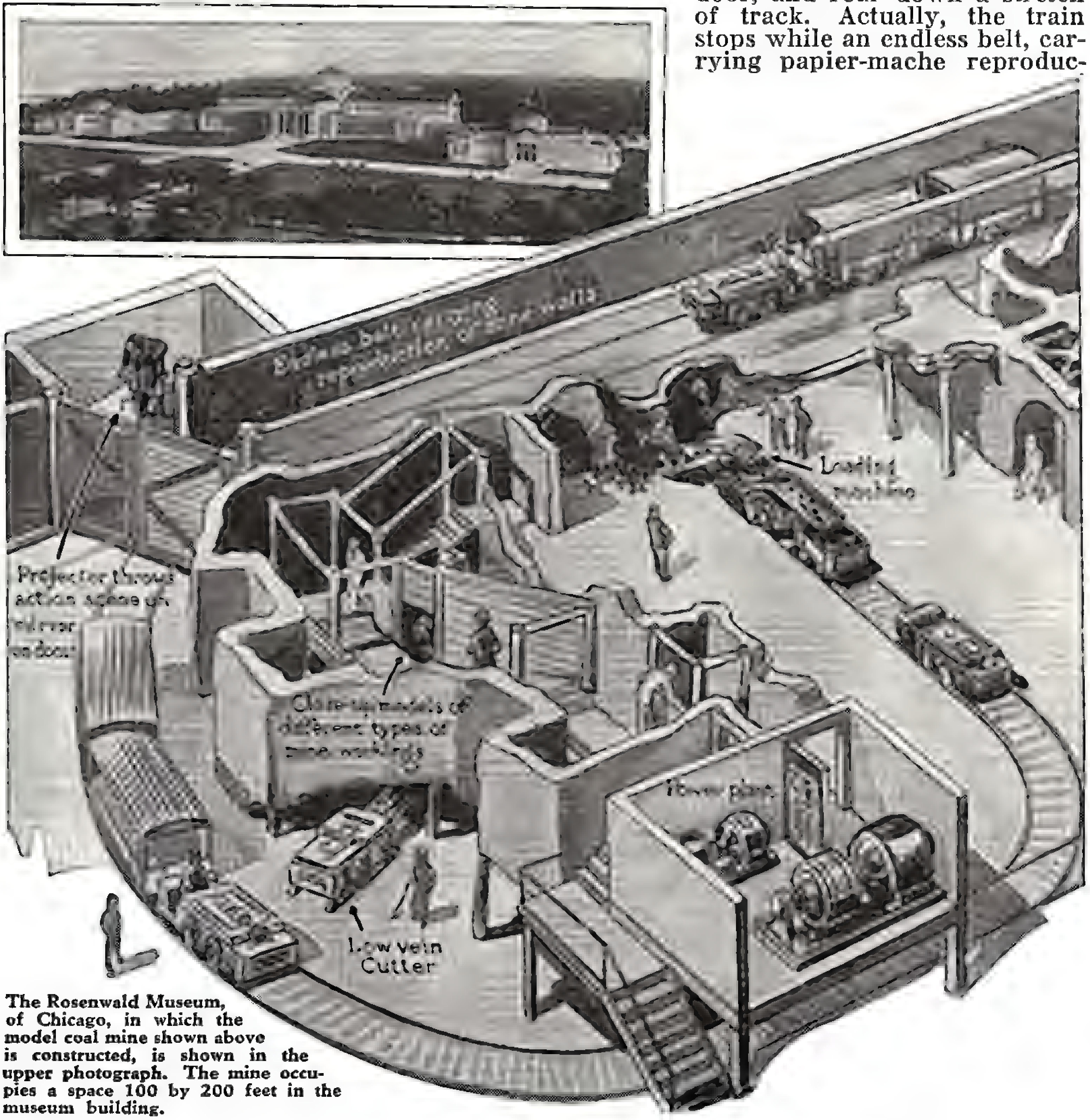
WHEN the Rosenwald Museum of Science and Industry opens in Chicago May 1, visitors will be treated to a trip through a real, working coal mine, despite the fact that the nearest coal deposits are 200 miles away.

They will descend in a real mine cage to a depth of 500 feet and take a trip of more than a mile on a real mine train through the workings. Or at least, such will be their impression. Actually the descent will be but 50 feet, to the museum's sub-basement, and the entire mine is packed into a space of less than 100 by 200 feet on two floors.

Visitors will descend in a real mine car capable of holding 30 passengers. The car starts, stopping without the passengers realizing it while 450 feet of shaft wall, on an endless belt, flashes before their eyes to give the illusion of continuous descent. At the same time they feel the rush of cool mine air, chemically charged with the decayed vegetation odor of a mine, forced from a blower at the bottom of the shaft.

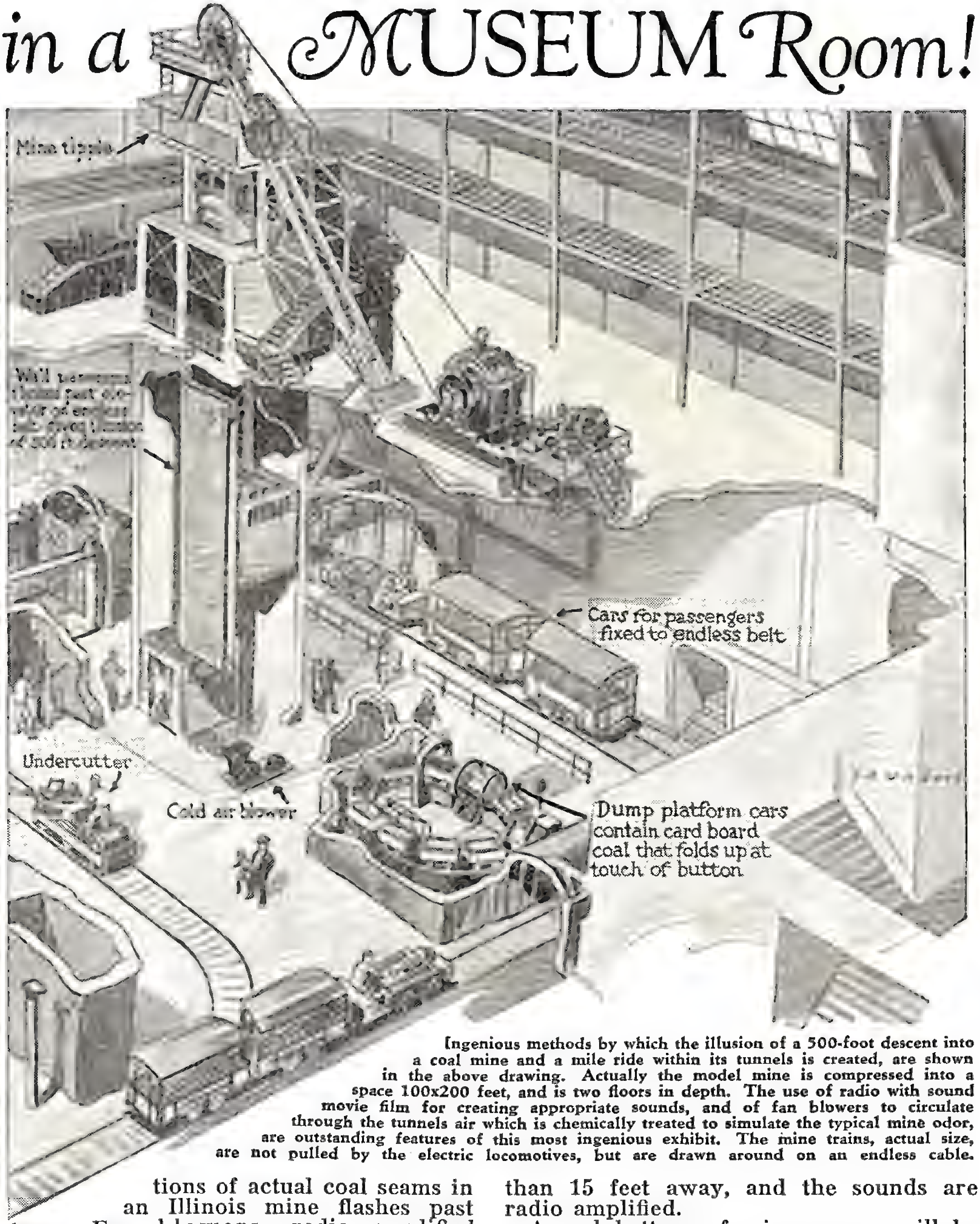
Emerging, they watch an endless string of coal cars being unloaded. Illusion again! The "coal" is a cork imitation, wired to a screen on top of the cars which folds up and disappears at the touch of a button. Simultaneously a can of gravel, attached to a microphone and radio amplifiers, is tipped into a metal hopper to produce the din of coal sliding down a chute.

The visitors get into two mine cars, apparently pulled by an electric locomotive. They round a corner, pass through a fire door, and roar down a stretch of track. Actually, the train stops while an endless belt, carrying papier-mache reproduc-


Endless belt carrying reproduction of mine walls
Loading machine
Projector throws action scene on mirror on door
Close-up models of different types of mine workings
Power plant
Low vein Cutter

The Rosenwald Museum, of Chicago, in which the model coal mine shown above is constructed, is shown in the upper photograph. The mine occupies a space 100 by 200 feet in the museum building.

in a MUSEUM Room!


Mine tipple
Cars for passengers fixed to endless belt
Undercutter
Cold air blower
Dump platform cars contain card board coal that folds up at touch of button

Ingenious methods by which the illusion of a 500-foot descent into a coal mine and a mile ride within its tunnels is created, are shown in the above drawing. Actually the model mine is compressed into a space 100x200 feet, and is two floors in depth. The use of radio with sound movie film for creating appropriate sounds, and of fan blowers to circulate through the tunnels air which is chemically treated to simulate the typical mine odor, are outstanding features of this most ingenious exhibit. The mine trains, actual size, are not pulled by the electric locomotives, but are drawn around on an endless cable.

tions of actual coal seams in an Illinois mine flashes past them. Fan blowers, radio amplified sounds, and a sparking trolley wire overhead complete the illusion of motion.

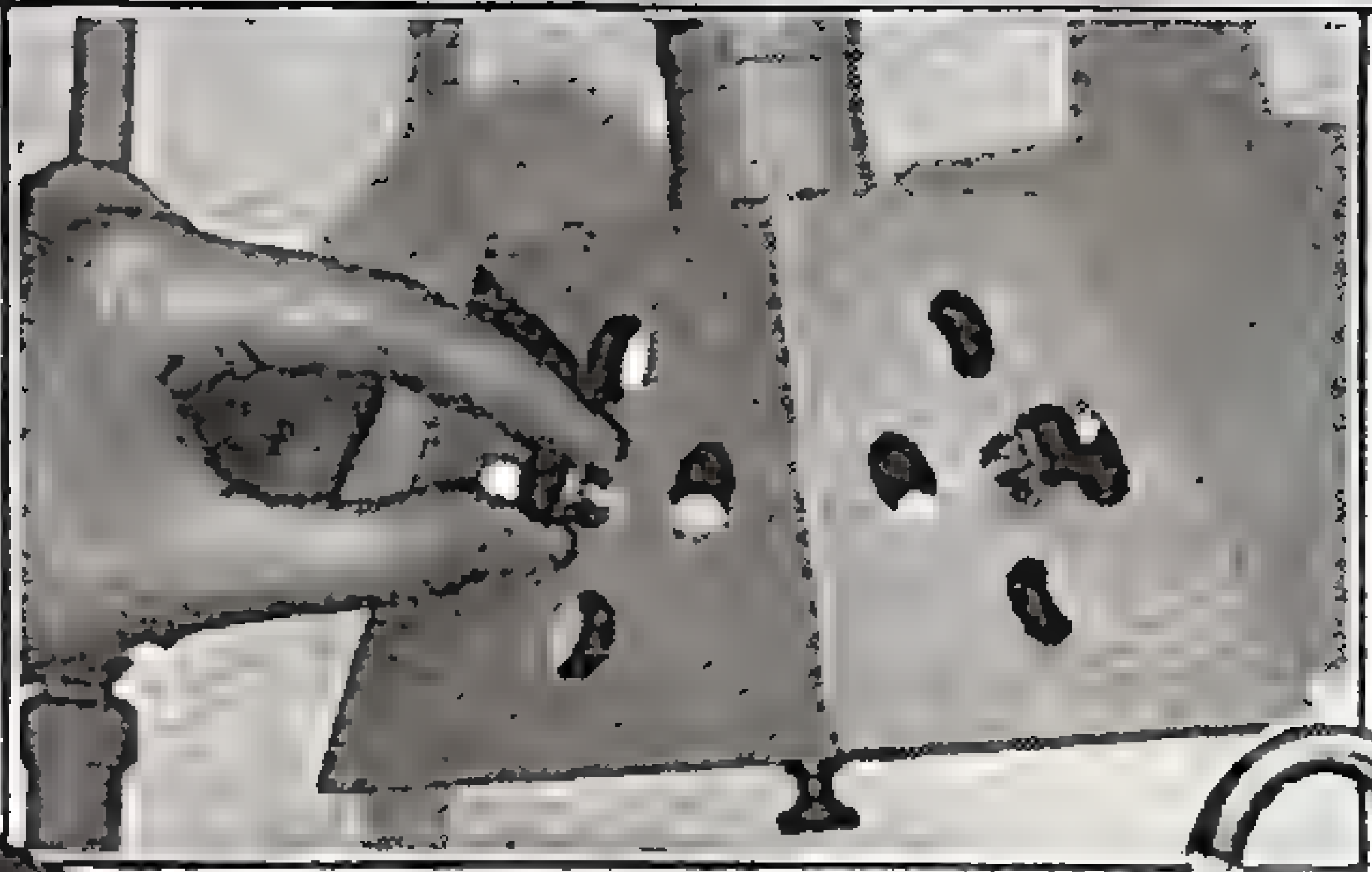
The mine train is one of three, each mounted on the same cable which circles around the mine. The locomotive does no hauling. While one train is being loaded, the other has stopped opposite the moving walls, while the third pauses alongside a low-vein cutting machine in action. In traveling alongside the moving walls, long, dimly-lighted galleries are seen leading off into the distance, where trains of loaded cars can be seen and heard rumbling over crossings. The trains, toy size, are less than 15 feet away, and the sounds are radio amplified.

A real battery of mine pumps will be seen in operation, pumping real water trickling down the gutters. The operators of the machines are also genuine, being union miners from southern Illinois.

From the operating mine, visitors will pass through another type of mine, where the vein ascends on a slant, instead of being laid flat.

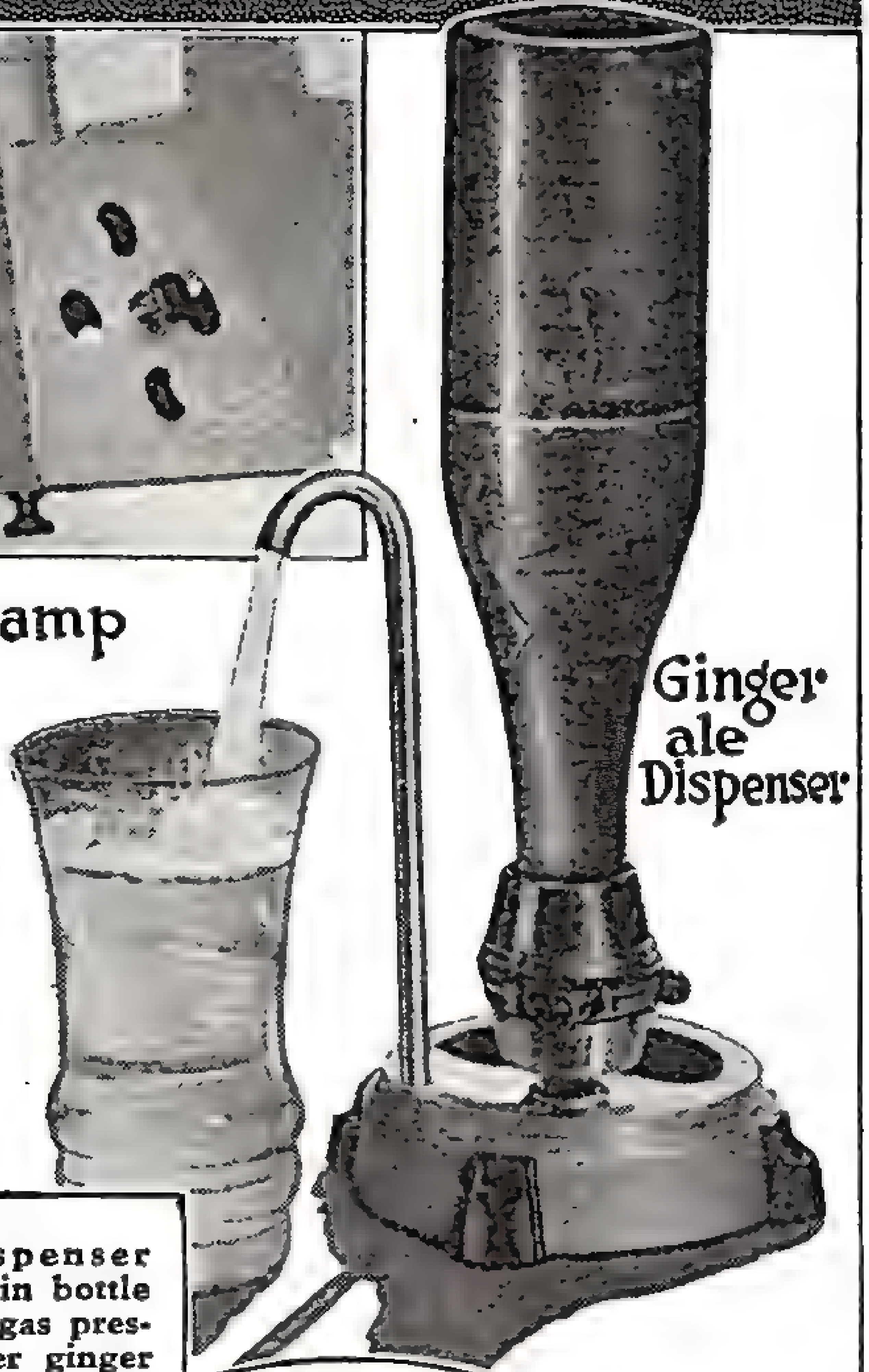
That is all that will be in operation this summer, but later the journey will continue through lead, zinc, silver, gold, and diamond mines, finally ending up with a 1,200-foot ascent in another mine car (again compressed into 50 feet).

Housekeeping Made Easier



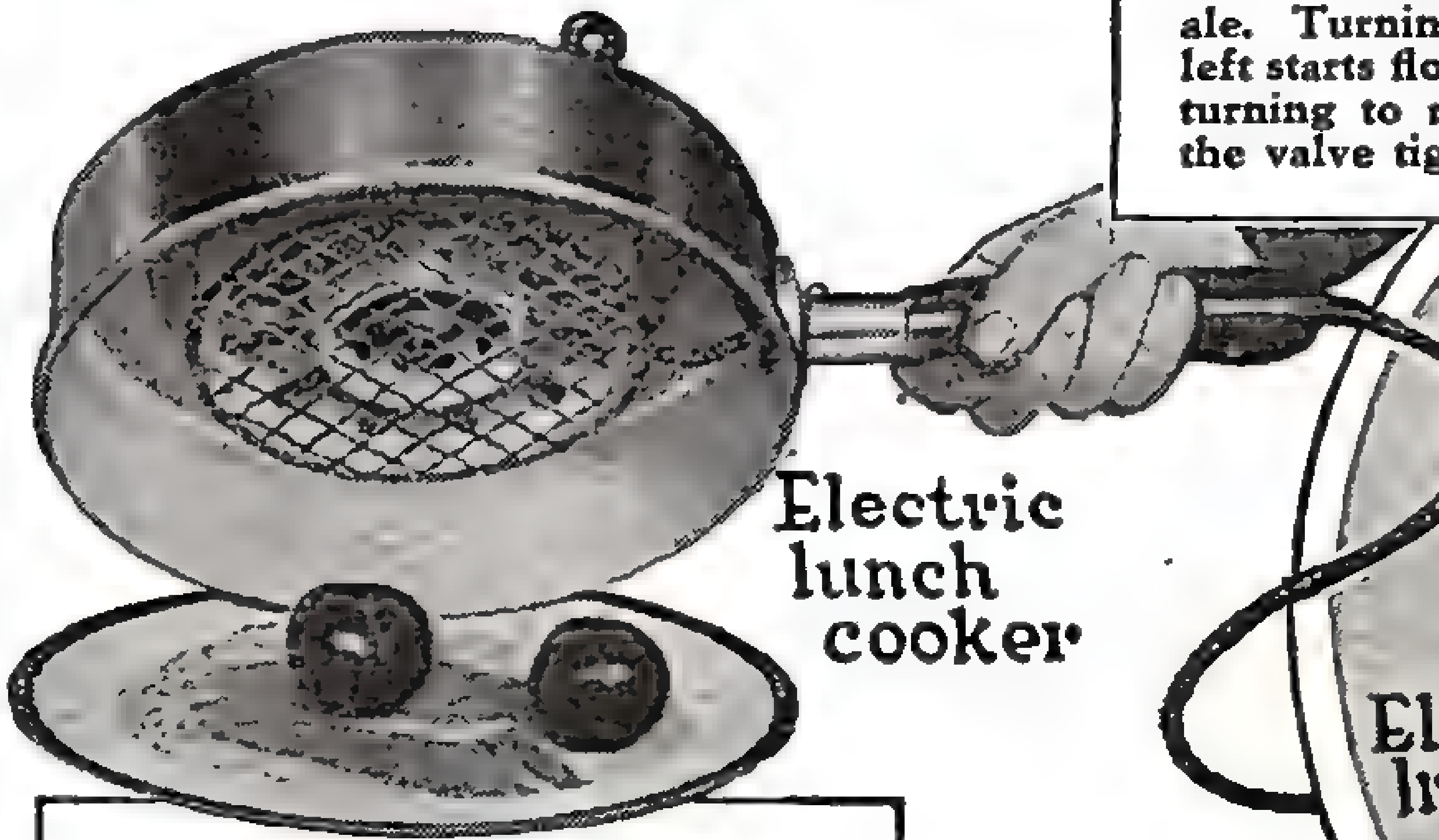
Shuttered lamp shade

Shuttered sides and bottom of new lampshade permit adjustment for any degree of light.



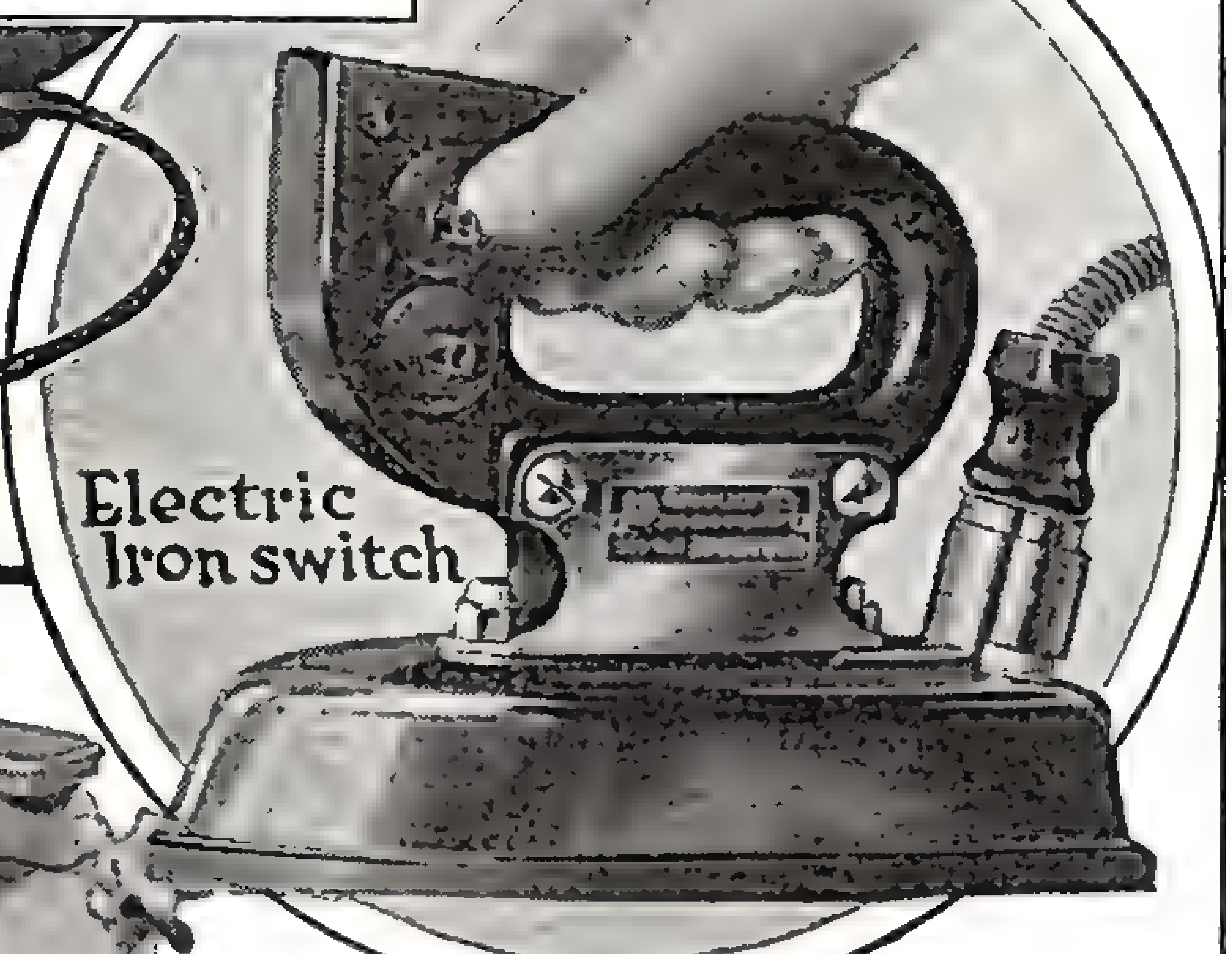
Ginger ale Dispenser

Handy dispenser punches hole in bottle cap, utilizing gas pressure to deliver ginger ale. Turning bottle to left starts flow of liquid, turning to right closes the valve tightly again.



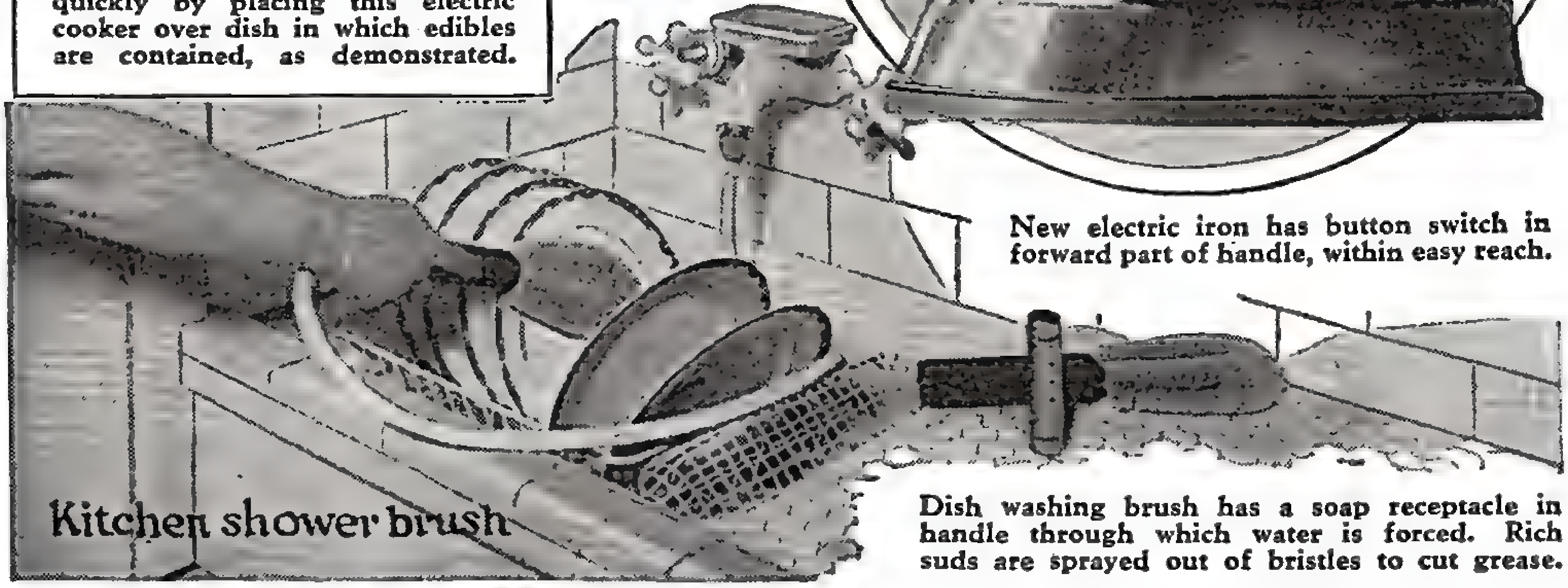
Electric lunch cooker

Breakfasts, lunches are prepared quickly by placing this electric cooker over dish in which edibles are contained, as demonstrated.



Electric Iron switch

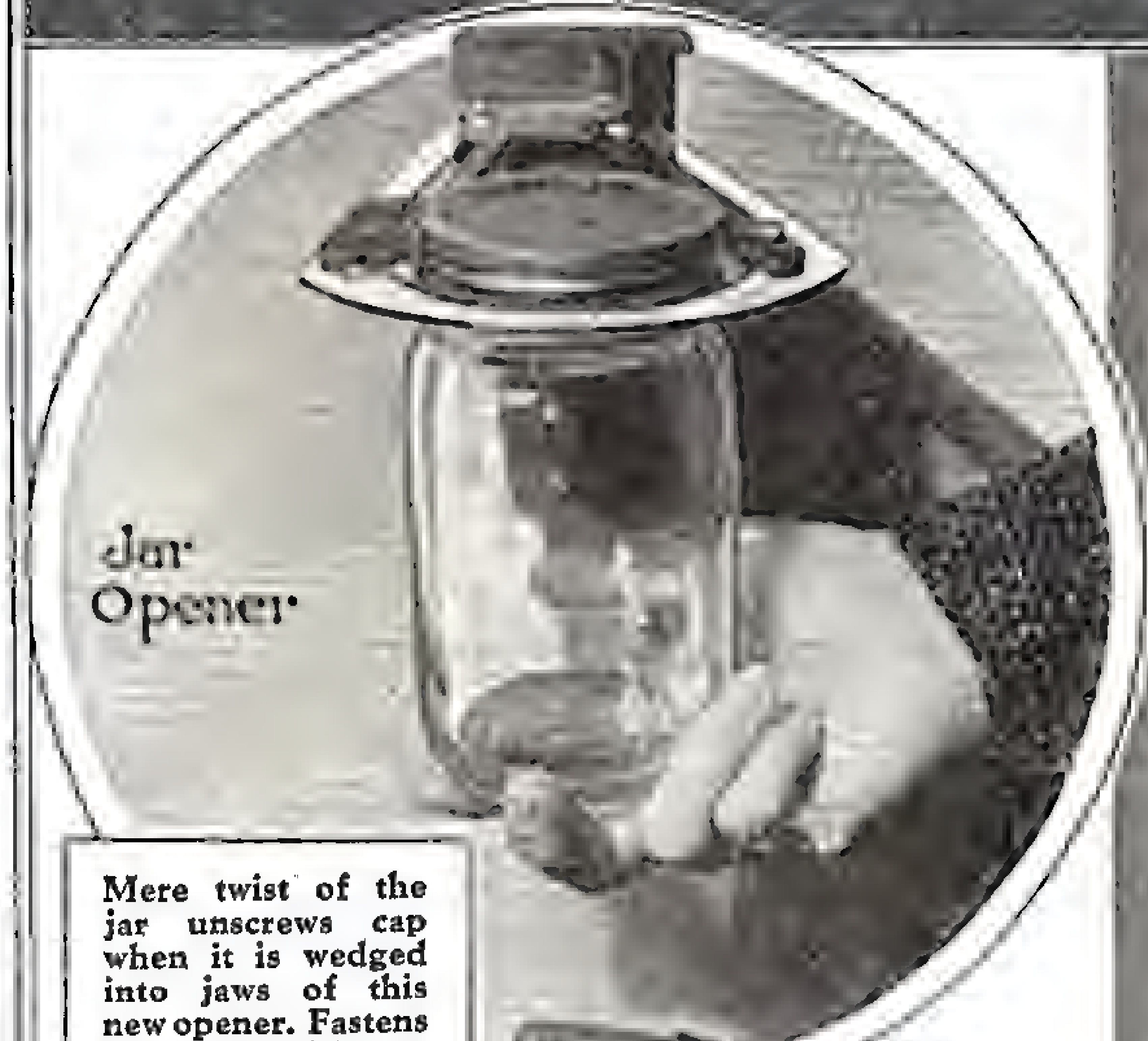
New electric iron has button switch in forward part of handle, within easy reach.



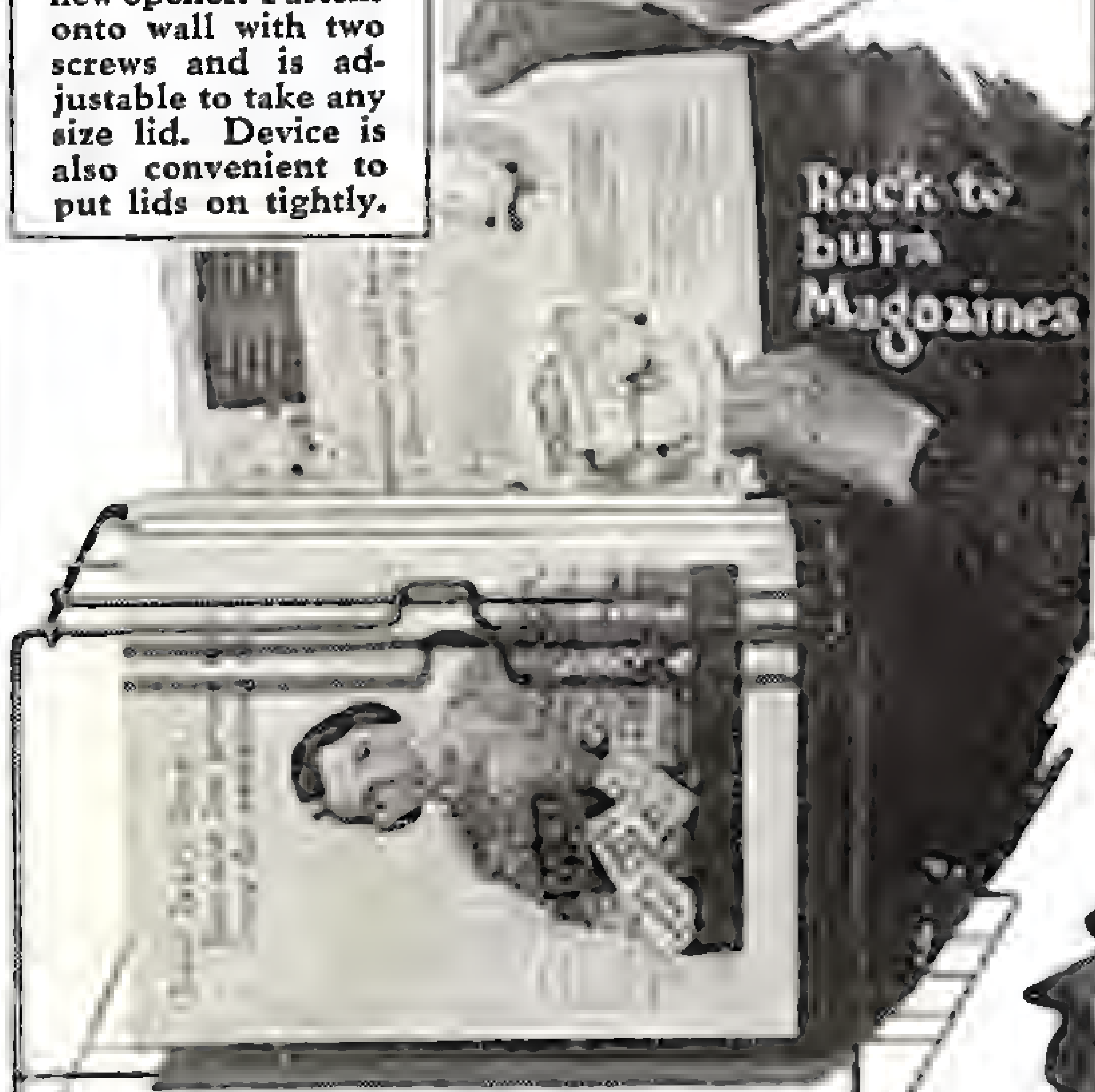
Kitchen shower brush

Dish washing brush has a soap receptacle in handle through which water is forced. Rich suds are sprayed out of bristles to cut grease.

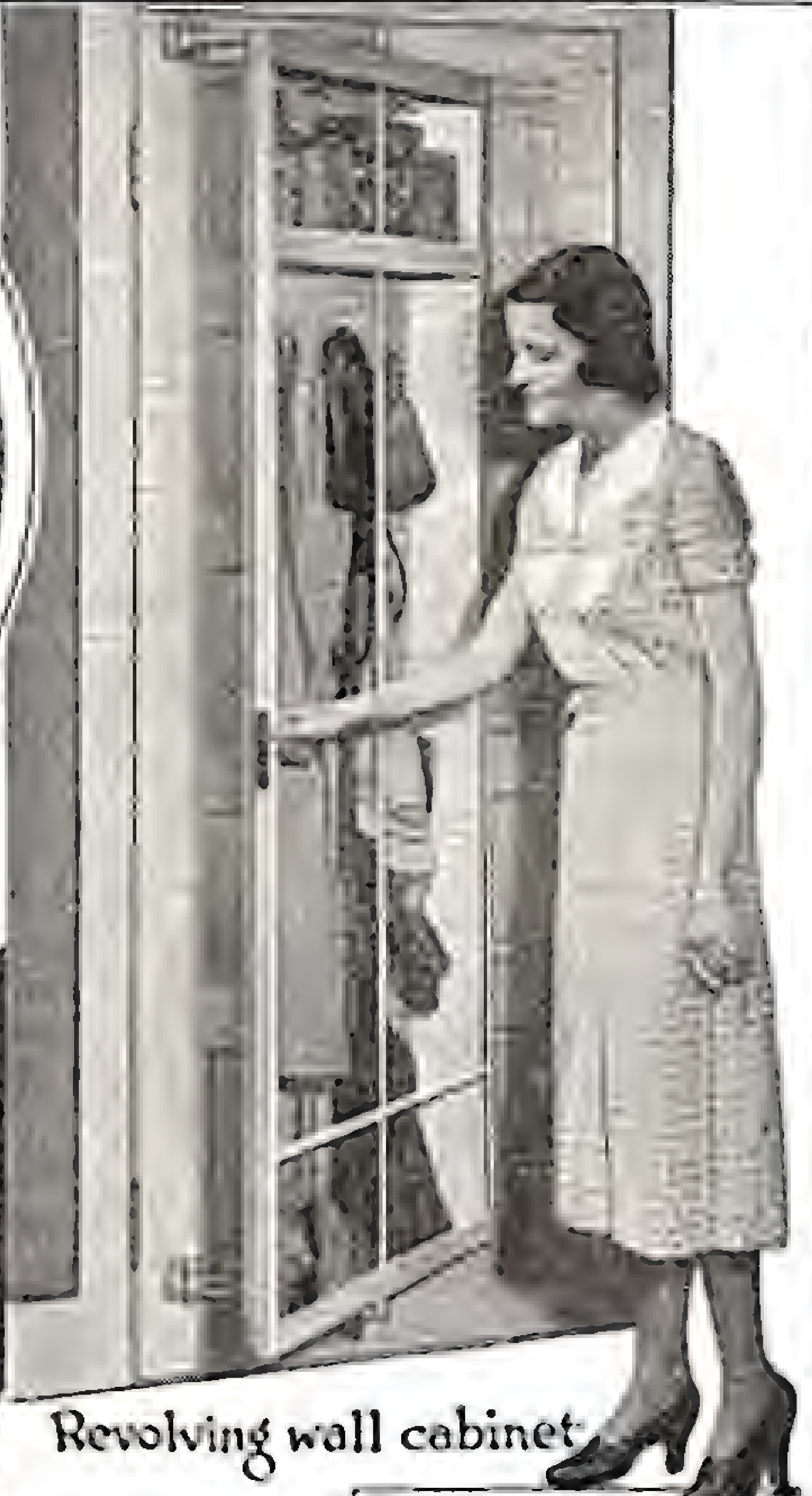
With These New Devices



Mere twist of the jar unscrews cap when it is wedged into jaws of this new opener. Fastens onto wall with two screws and is adjustable to take any size lid. Device is also convenient to put lids on tightly.


Rack to burn Magazines

Conserve coal by burning old magazines, which last for 25 minutes when suspended from wires on grate rack as shown.

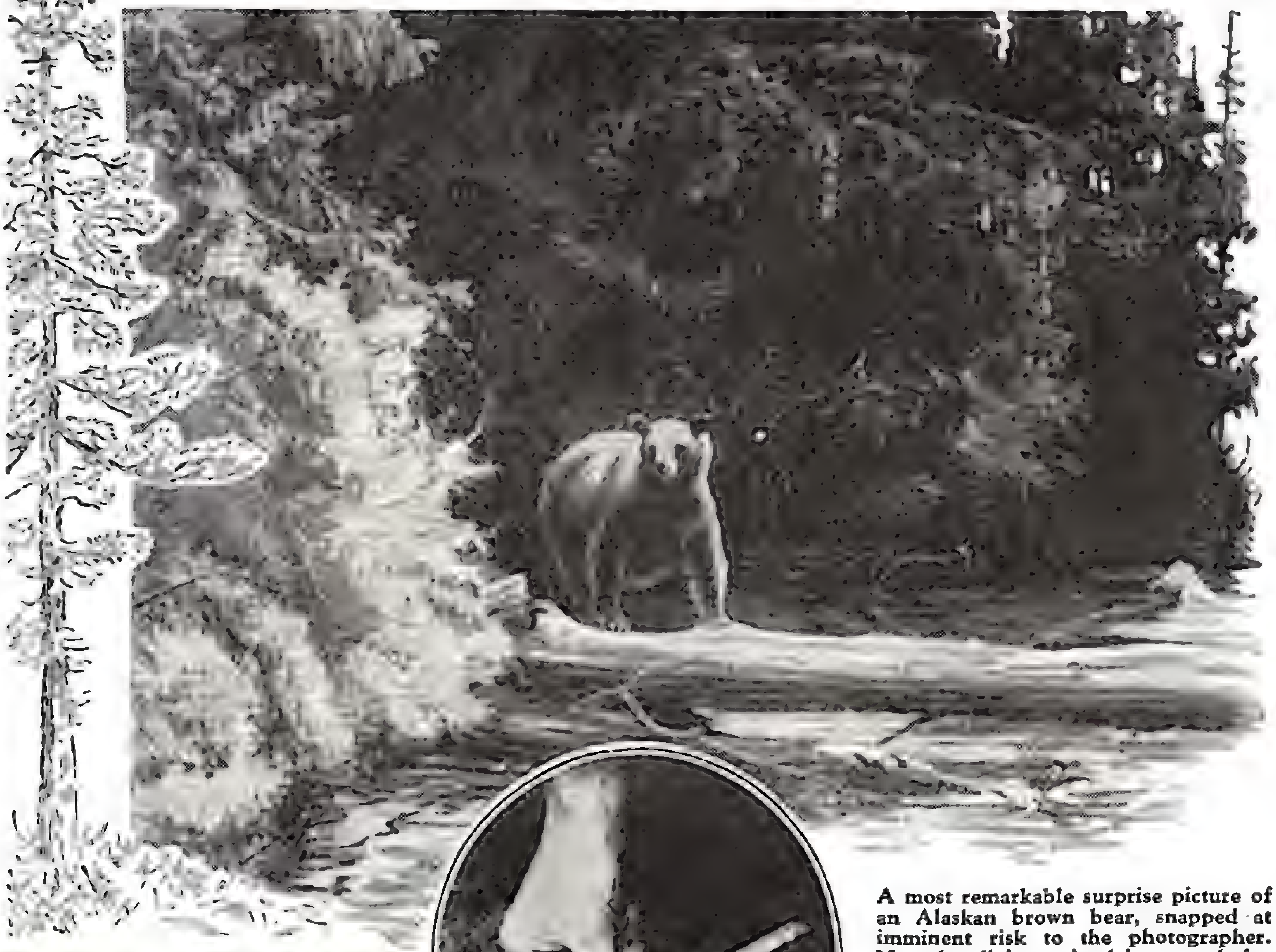

Revolving wall cabinet

Secured to door or wall, new type cabinet swings around completely out of the way to solve problem of limited storage space.

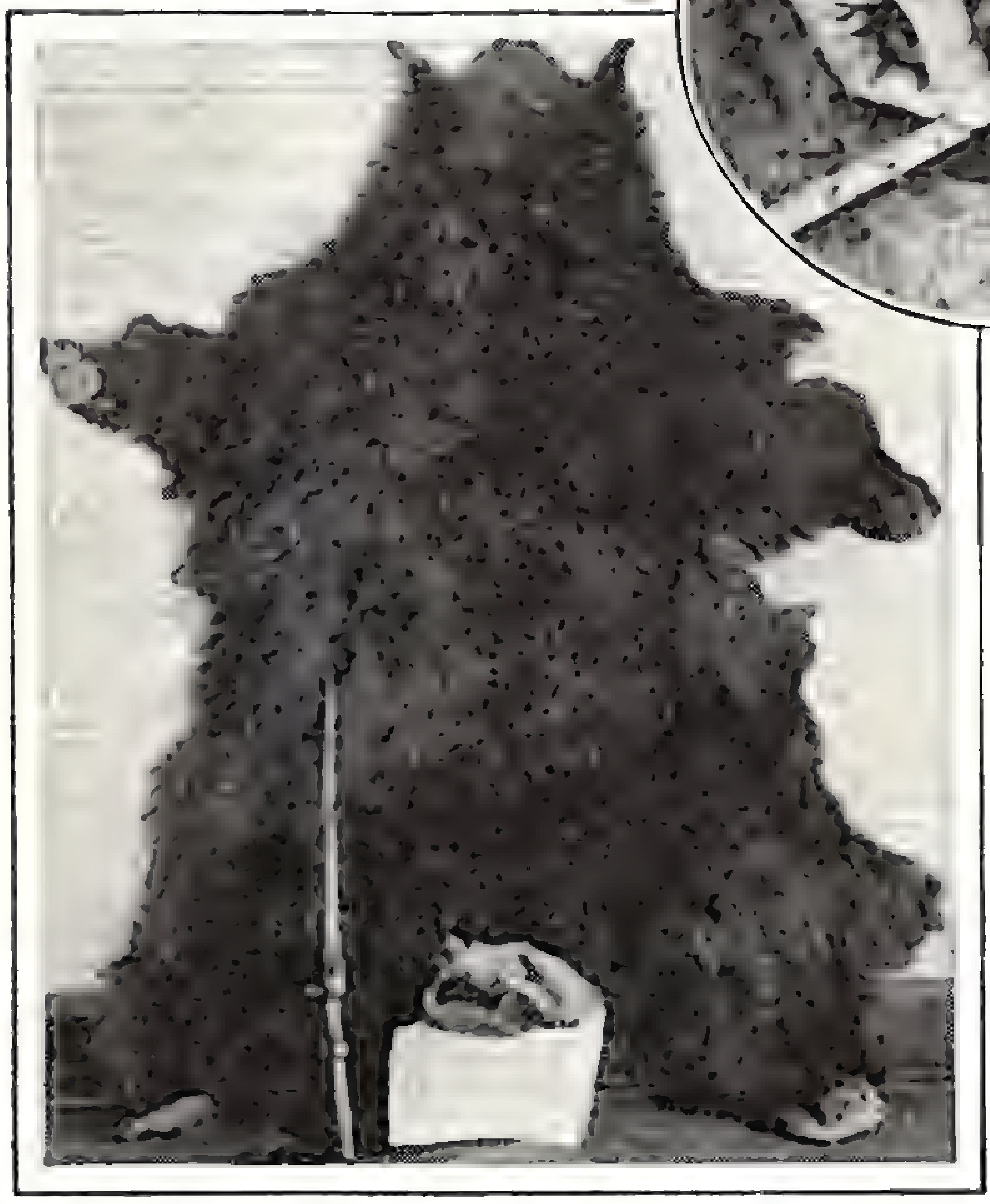
Rubber dishes and Utensils

Unbreakable rubber dishes and utensils are being made from "Plioform," a rubber base product. Resists hot water, will not scratch.

Getting Personal with the



A most remarkable surprise picture of an Alaskan brown bear, snapped at imminent risk to the photographer. No other living animal is a match for the brown bear in quickness and strength. Photo reproduced through courtesy of Nature magazine. In circle, at left, is shown measurement of bear tracks—seven inches across!



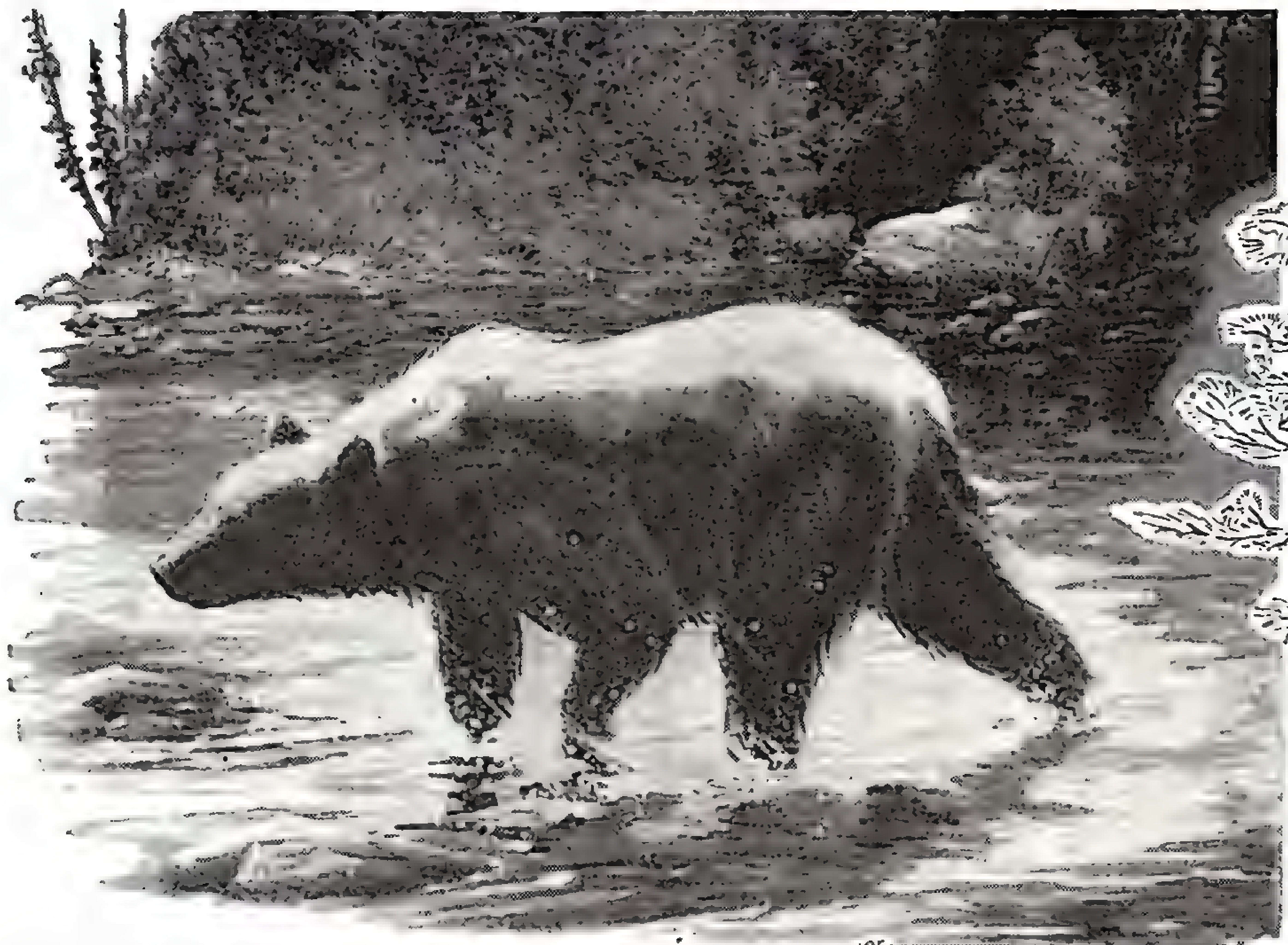
This skin is from a grizzly which weighed 1500 lbs.—some 500 lbs. less than the brown bear attains. Size can be judged by the seven-column newspaper on which the skull rests.

by James Nevin Miller

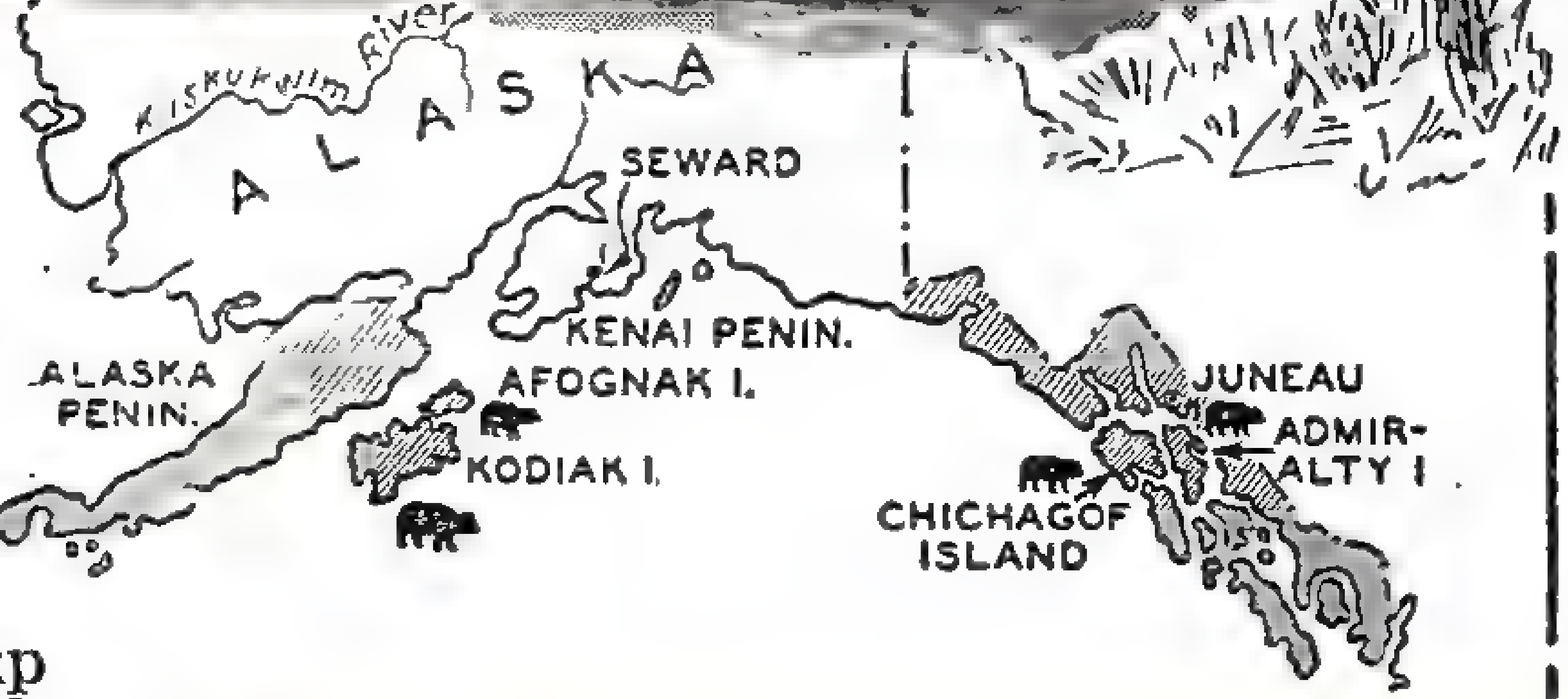
Have you always believed that the grizzly is the biggest and most dangerous of all bears? If so, it will surprise you to learn that the grizzly averages about half the size of the great Alaskan Brown Bear. This article will upset a lot of your previous notions about bears in general.

WHILE official Washington is all agog about whether the famous brown bear of Alaska, whose tremendous skin ranks among the most prized trophies in the world, is being exterminated by over-zealous hunters, almost countless stories are being told by bear experts concerning thrilling and almost unbelievable experiences of hunters, prospectors, guides, naturalists and government investigators who were unfortunate enough to meet some of these jungle monarchs unexpectedly.

World's Biggest Bears



Action! One of the rarest of all brown bear photos, showing a ton of muscle and bone making a bee line toward a hunter who has aroused his anger. A tiger or a lion would be helpless in combat with this powerful beast. The map at right shows habitat of the Alaskan brown bear. Shaded sections indicate areas proposed as game reserve where hunting of such bears shall be restricted. Kodiak and Afognak are the famous islands of the Aleutian group that attract hunters of the brown bear.



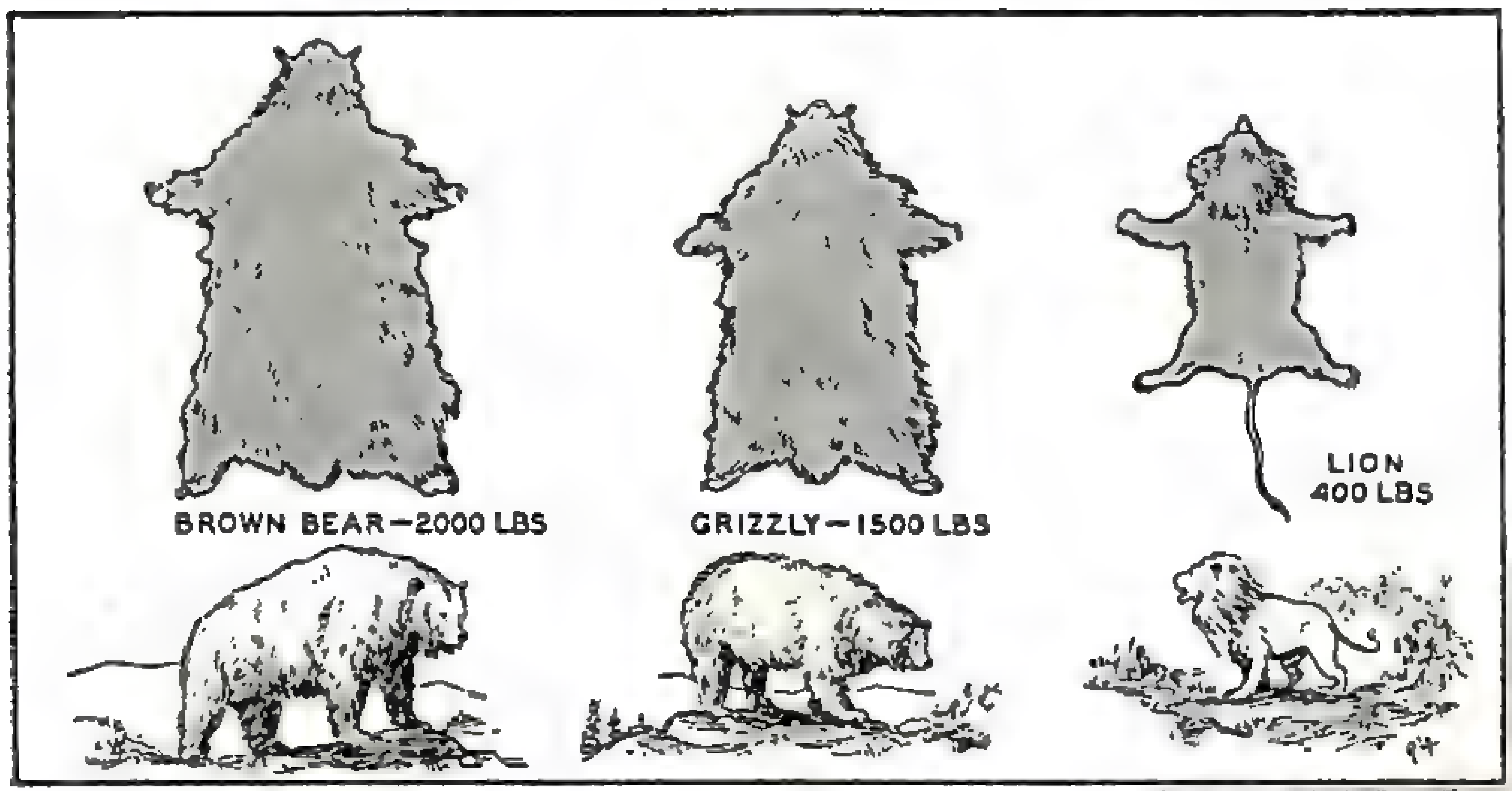
The Alaskan brown bears form a group of gigantic animals peculiar to North America and limited to the coast and islands of Alaska from the head of Norton Sound to the Sitka Islands. On Kodiak Island they attain weights sometimes exceeding 2,000 pounds, and their skins have been mounted measuring 13½ feet from tip of nose to tip of tail. They can be likened only to the great cave bears which were the haunting terror of primitive mankind during the old stone age in Europe.

In color the animals vary considerably—from a dull golden-yellowish shade to a dusky brown, becoming almost black in some species. Some of the darker types are indistinguishable from the great grizzlies with which in places they share the range, but the relatively shorter, thicker and more strongly-curved claws on the front feet are distinctive; moreover, the grizzlies average about half the size of the "brownies."

Certain species occupy open, rolling or hilly tundras and others live on the steepest and most rugged mountain slopes and

Bears are good fishermen. This Alaskan Brownie is spearing salmon from a stream. Brown bears, incidentally, aren't always brown—some of them are almost black in color. His temper is uncertain, no one being able to predict whether he'll charge a human being or turn tail and run.

Lion Is Backwoods Amateur for Brute Strength; Brown Bear Holds Title



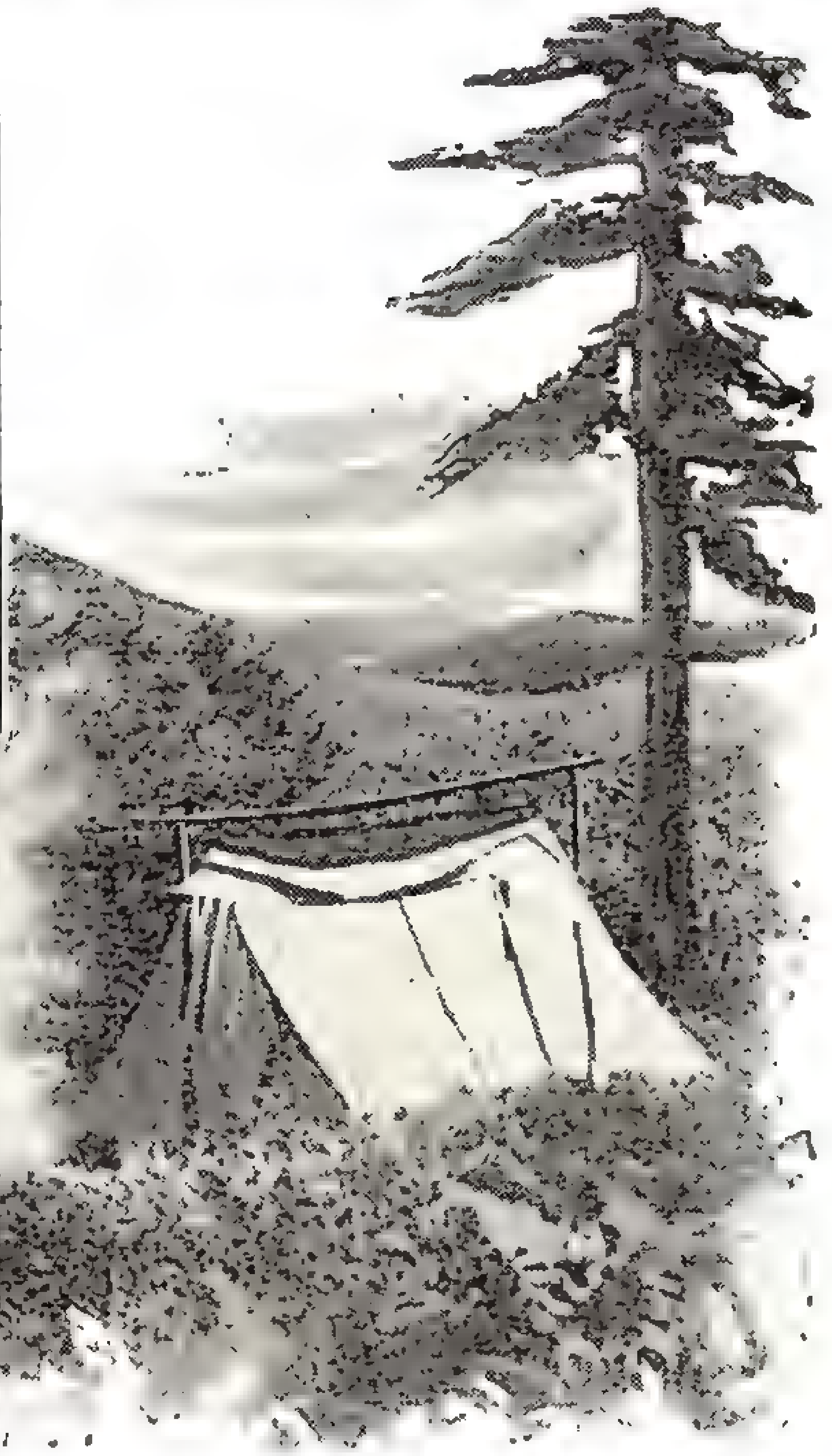
What chance would a lion, the usual standard of animal ferocity, have with a bear? These size-diagrams tell their own story of their comparative killing power.

This bear is just a baby of the species, but his skin will make an impressive rug. He tried to flee from his hunter, but, according to the stories that experts tell of bears, they are just as likely to attack as run.

glaciers, rock slides and perpetual snowbanks. On the approach of winter all retreat to dry locations, usually in the hills, where they dig dens in the earth, or seek other cover to which they retire to hibernate. Here the young, usually two or three in number, are born. They ordinarily emerge from hibernation in April or early May.

Opinions differ about the ferocity of the average brownie. Some experts claim he'll never charge a human being unless wounded; while others insist he is dangerous to man at all times and will charge him entirely without intimidation. One thing, at least, seems certain—the Alaska bear has been endowed with a fabled ferocity—in a real sense he is the heavyweight champion of the world.

John W. Eddy, famous naturalist, points out: "In mortal combat, the giant bear, with his great strength, weight and quickness, could defeat any other animal. Imagine a lion weighing 400 pounds (they seldom weigh so much) springing on the back of a bear weighing 1,600 pounds. It would be like an active child of 50 pounds undertaking to fight the champion heavyweight pugilist weighing 200 pounds."



Camp of U. S. ranger who helped make official census of the brown bears on Admiralty island. On this island, 100 miles long and 25 miles wide, some 900 bears were counted.

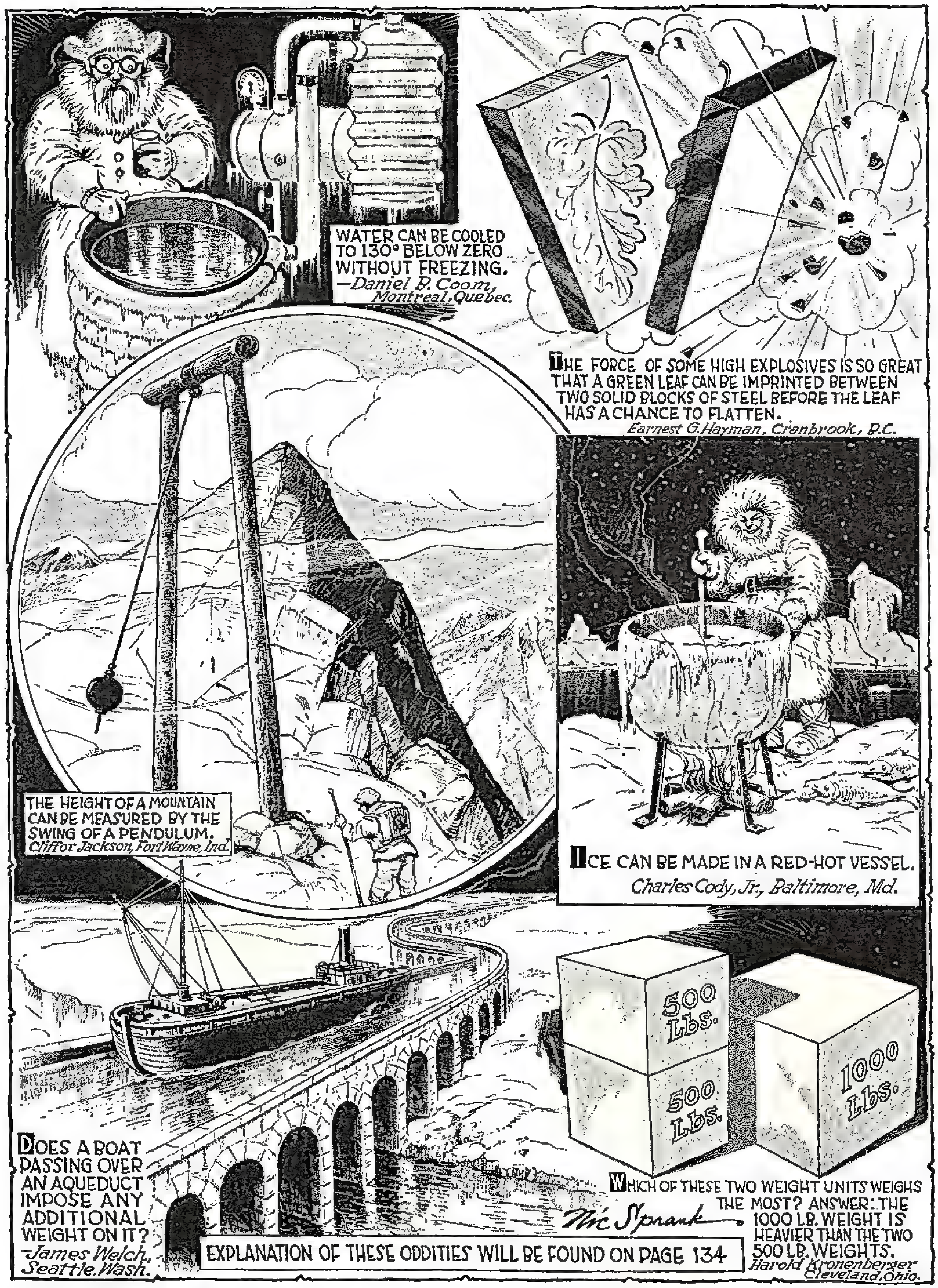
H. E. "Colonel" Revelle, one of the best known big-game guides on the Kenai Peninsula, says: "No man living can tell what a brownie is going to do until he does it. In the early days on the Kenai Peninsula I hunted bear for the hide markets and I know a brownie is not afraid of anything that walks. He may not come at you, but it's not because he's afraid of you, it's because he doesn't like the smell of a human being. I've seen an old sow run away and leave her cubs, and I've seen 'em come at you without any warning at all—just let out a roar and come a-running the minute they get your scent.

"I remember one spring, my partner and I were hunting on the mountain back of where Seward now stands. We sighted a brownie up on the hill and made a sneak across to get within range. The bear was fast asleep in the tall grass and we got plenty close for a good shot. When we fired together that bear let out a roar like they all do when they're hit, but we dropped her cold before she could move.

(Continued on page 33)

Oddities of SCIENCE

by NIC SPRANK



500 Lbs.
500 Lbs.
1000 Lbs.

WATER CAN BE COOLED TO 130° BELOW ZERO WITHOUT FREEZING.
—*Daniel B. Coom, Montreal, Quebec.*

THE FORCE OF SOME HIGH EXPLOSIVES IS SO GREAT THAT A GREEN LEAF CAN BE IMPRINTED BETWEEN TWO SOLID BLOCKS OF STEEL BEFORE THE LEAF HAS A CHANCE TO FLATTEN.
Earnest G. Hayman, Cranbrook, B.C.

THE HEIGHT OF A MOUNTAIN CAN BE MEASURED BY THE SWING OF A PENDULUM.
Cliffor Jackson, Fort Wayne, Ind.

ICE CAN BE MADE IN A RED-HOT VESSEL.
Charles Cody, Jr., Baltimore, Md.

DOES A BOAT PASSING OVER AN AQUEDUCT IMPOSE ANY ADDITIONAL WEIGHT ON IT?
-James Welch, Seattle, Wash.

WHICH OF THESE TWO WEIGHT UNITS WEIGHS THE MOST? ANSWER: THE 1000 LB. WEIGHT IS HEAVIER THAN THE TWO 500 LB. WEIGHTS.
Harold Kronenberger, Cleveland, Ohio.

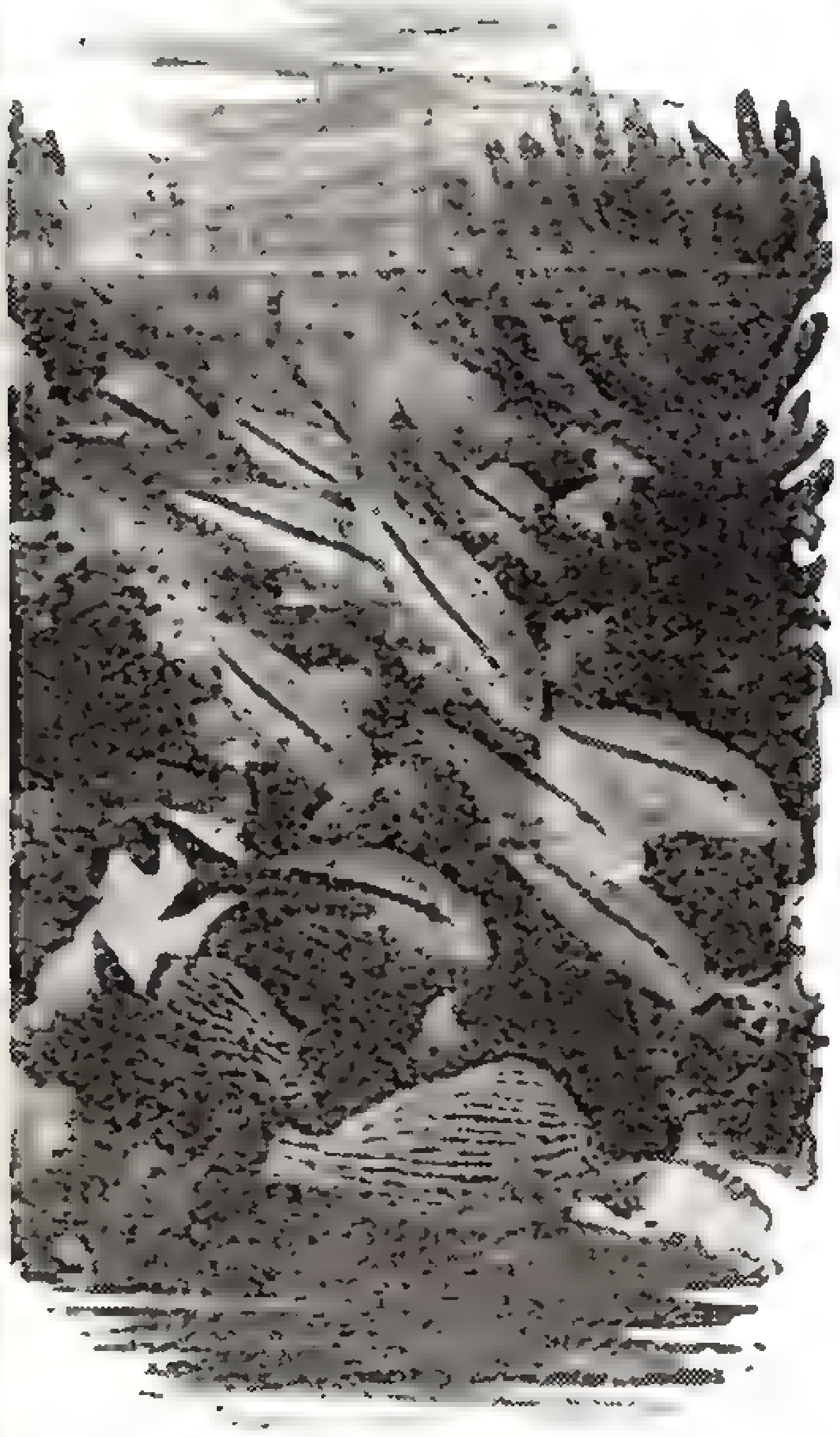
Nic Sprank

EXPLANATION OF THESE ODDITIES WILL BE FOUND ON PAGE 134

ONE DOLLAR will be paid by Nic Sprank for oddities of science used on this page. Send in your ideas—no limit to the number of suggestions you may make, but be sure to enclose proof of your statements. Maybe your ideas will be better than those shown on this page—if they are, Nic Sprank wants them and will be glad to send you a check. Address suggestions to Nic Sprank, care of Modern Mechanix and Inventions, 529 South Seventh Street, Minneapolis, Minn.

FREAKISH DRAMAS of

Here Dr. Longley, head of the Tortugas biological station, prepares for a 55-ft. descent to sea bottom in 85-lb. diver's helmet. Undersea photos are taken with waterproof camera.



Here's a flashlight picture of a school of yellow goatfish and yellow grunts taken on sea bottom of Florida Keys.

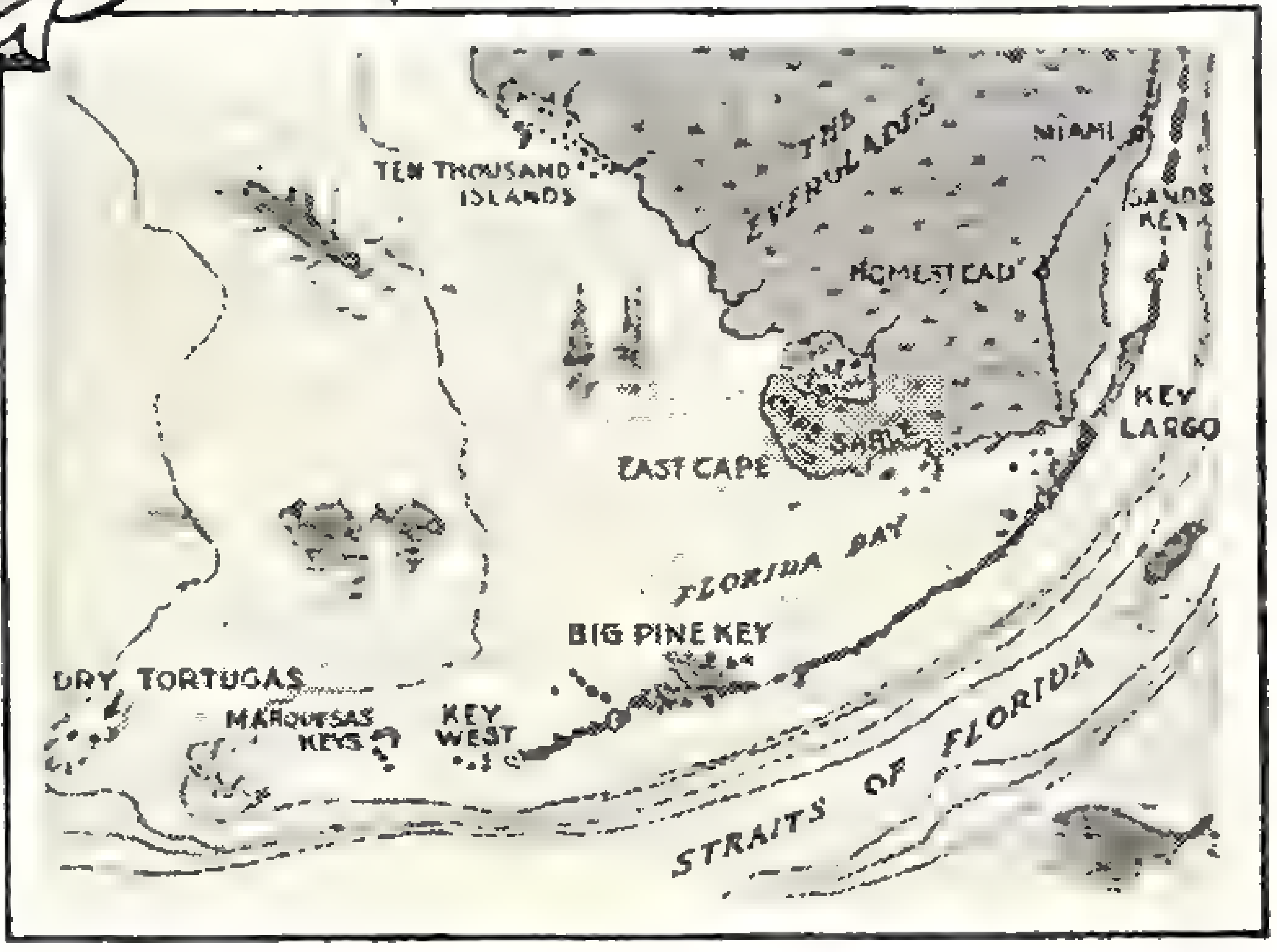
THE tentacles of an octopus crept stealthily out from an overhanging ledge and seized its unwary prey.

A four-foot barracuda—"tiger of the sea"—with one lightning dart and a single quick snap of its powerful jaws cut a silver snapper in two.

The stalks, branches and blossoms of plant-like structures that swayed everywhere in profusion were in reality clever devices for catching, devouring, and assimilating living organisms.

We watched this drama from a passageway on the bottom of the sea off Dry Tortugas Islands that mark the extreme western limit of the Florida Keys. The octopus paid no attention to us, if indeed he saw us at all, or possibly was repelled by our grotesque under-sea helmets and the tenuous air lines rising to the *Anton Dohrn* resting gently on the surface of the sea fifty feet overhead. The barracuda came near, nosed our garments, and slid away through the opalescent water.

We walked among the coral polyps and their cousins the anemones of every conceivable color—brown, violet, pink, white, yellow, purple, bright blue, vivid scarlet. Then my breath caught. All about us lay what appeared to be petrified human brains. I learned later that they were only "brain coral," whose skeletal support resembles the convolutions of the human brain.



Map of Florida Keys shows Dry Tortugas (extreme left), locale of extensive undersea exploration being conducted by Carnegie Institute Biological station under Dr. Longley.

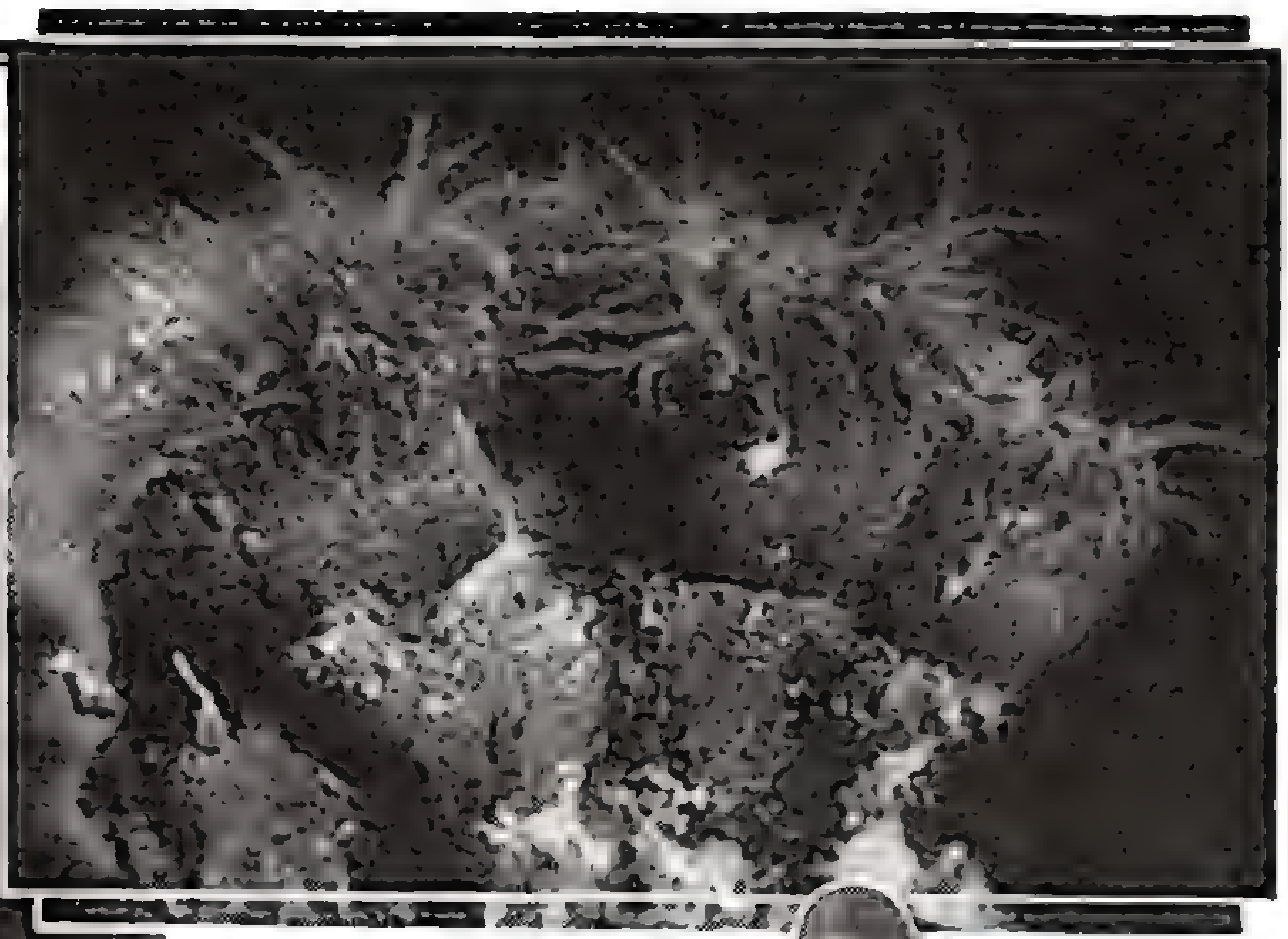
Troops of fishes that have changeable color patterns darted about among the coral formations. My companion unslung his water-proof camera, and with the aid of an electric flashlight took a few photographs of schools of gray snappers, yellow goatfish, and yellow grunts.

Dr. Longley, the scientist in charge of the marine biological station at Tortugas, has spent more than 3,000 hours in all on the bottom, watching and recording the ceaseless under-sea drama where the rule of the jungle, "kill or be killed," predominates, but where some extraordinary part-

the OCEAN Bottom

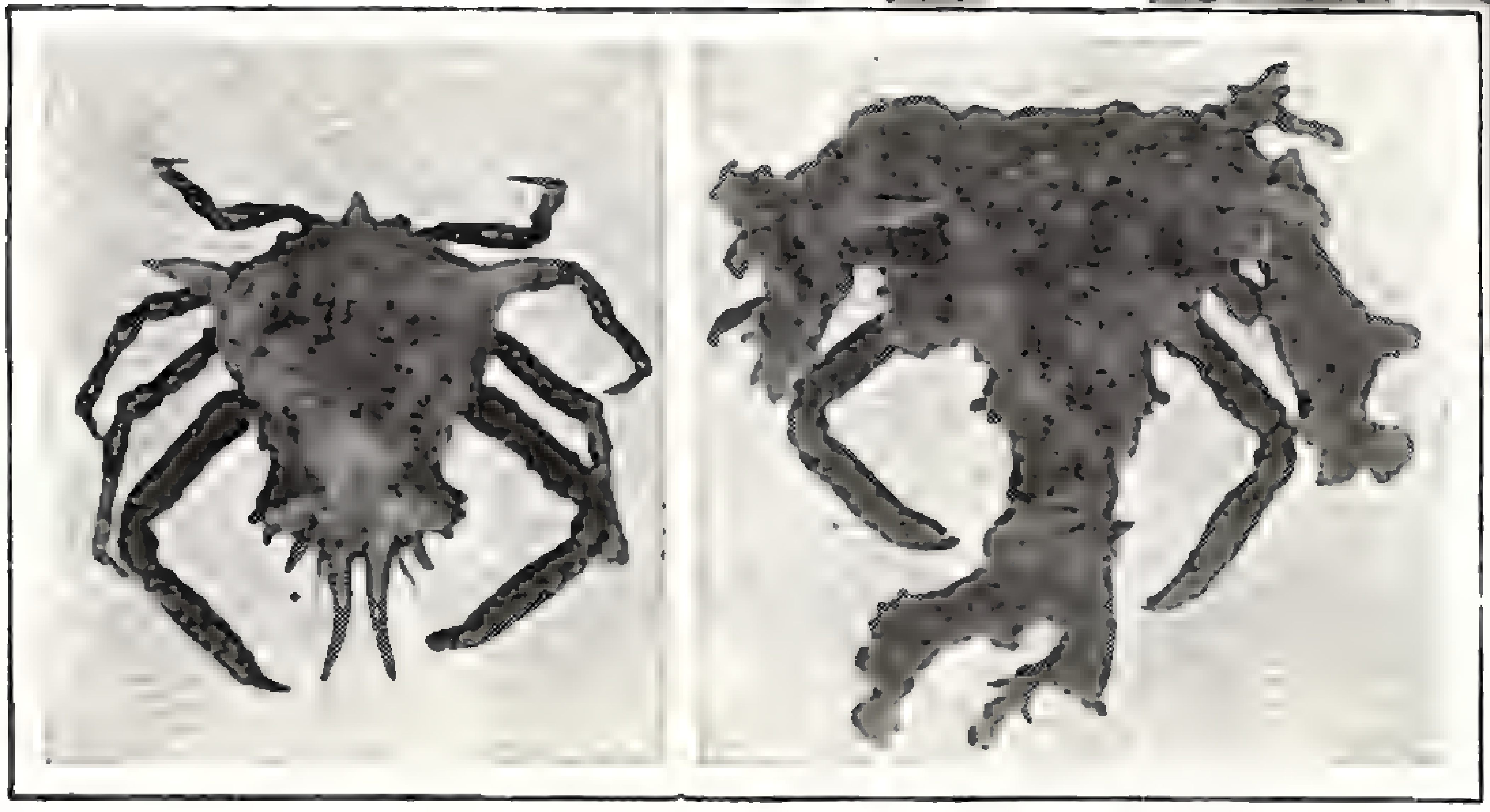
by C. MORAN

Remarkable undersea photo taken with flashlight bulb shows a school of gray snappers foraging for food.



A group of living coral polyps with fringe of tentacles on top for gathering food from the seawater.

Dr. Pearse, Duke University biologist, shown above as he sets out for day's exploration on bottom of sea.



Freak of the deep is Tortugas crab which conceals itself beneath a bit of sponge, which in short while takes root and grows on crab's shell. Offensive taste of the sponge protects crab against enemies. Photos show crab with and without sponge.

nerships among widely different types of organisms have also been formed.

One of these partnerships is between a coral reef crab and certain anemones. The crab removes anemones from the rocks to which the latter adhere and carries them fully expanded in its first or clawed pair of legs. When the crab is attacked it defends itself by pushing the anemones toward the assailant; as the anemones, in turn, capture food, the crab transfers part of it to its own mouth.

There are crabs that tear bits of living sponge off the rocks and hold them on their own shells until the sponges take root and begin to grow. Thereby the crabs secure effective protection from their enemies, for the species of sponge which they thus utilize is distasteful to many creatures as it is packed with flinty, needle-like bodies and gives off a disagreeable odor.

There is a vividly colored fish, about an inch and a half long, that is always hovering about the giant sea-anemone. Upon the slightest alarm it darts for the anemone "blossom" and disappears among its feathery tentacles. When danger passes the finny occupant emerges from its protective cover. It is said that this fish is so dependent upon the anemone that it dies if the two are permanently separated.

Sucker fishes which attach themselves to larger fishes are common at Tortugas.

(Continued on page 145)

Desperadoes Attempt Jail Break With Home-made Pistols

These two crude pistols, made secretly in prison workshop, aided two desperadoes in attempted break at Folsom prison.

MECHANICAL ingenuity serves many purposes, the latest and strangest being its application to plans for a jailbreak at Folsom Prison, California.

Two desperadoes, Marty Colson, in for murder, and Lloyd Sampsell, "Yachting" robber, worked for months with their own hands and prison tools making pistols for the big day. Finally, armed with these weapons, they made a desperate attempt at freedom, held up five employees in the administration building, and sent a message to summon the warden.

The warden got the jump on the criminals, however, and surrounded the prison with armed guards. Sampsell finally surrendered, but Colson turned his home-made pistol on himself and fired a home-made bullet into his heart.

Find 76,000 New Universes in Sky

SEVENTY-SIX thousand new universes, each of them presumably consisting of a gigantic cloud of stars millions of billions of miles across, have been discovered in a recent photographic survey of the southern part of the heavens. Dr. Harlow Shapley estimates that the total number of these distant universes in all directions from the earth probably is at least 300,000.

Smoke Trail Shows Bridge Route

SPECTATORS at the ground breaking ceremonies of the world's largest suspension bridge which is soon to arise across the famous Golden Gate in San Francisco, were shown very plainly where the bridge would be located. Following the bridge route, a navy plane sped across the water, emitting a streak of smoke, showing just where the bridge would be erected.

The bridge is to cost $35,000,000 and will have one span over a mile long.

Ticket Printers for Busses

Ticket printer is carried by conductor as shown here.

CONDUCTORS on London omnibuses print their tickets nowadays right on the scene, just as they are needed for issuance to passengers. What makes this convenience possible is the invention of a ticket printing device which may be carried by the conductor, as demonstrated in the photo above.

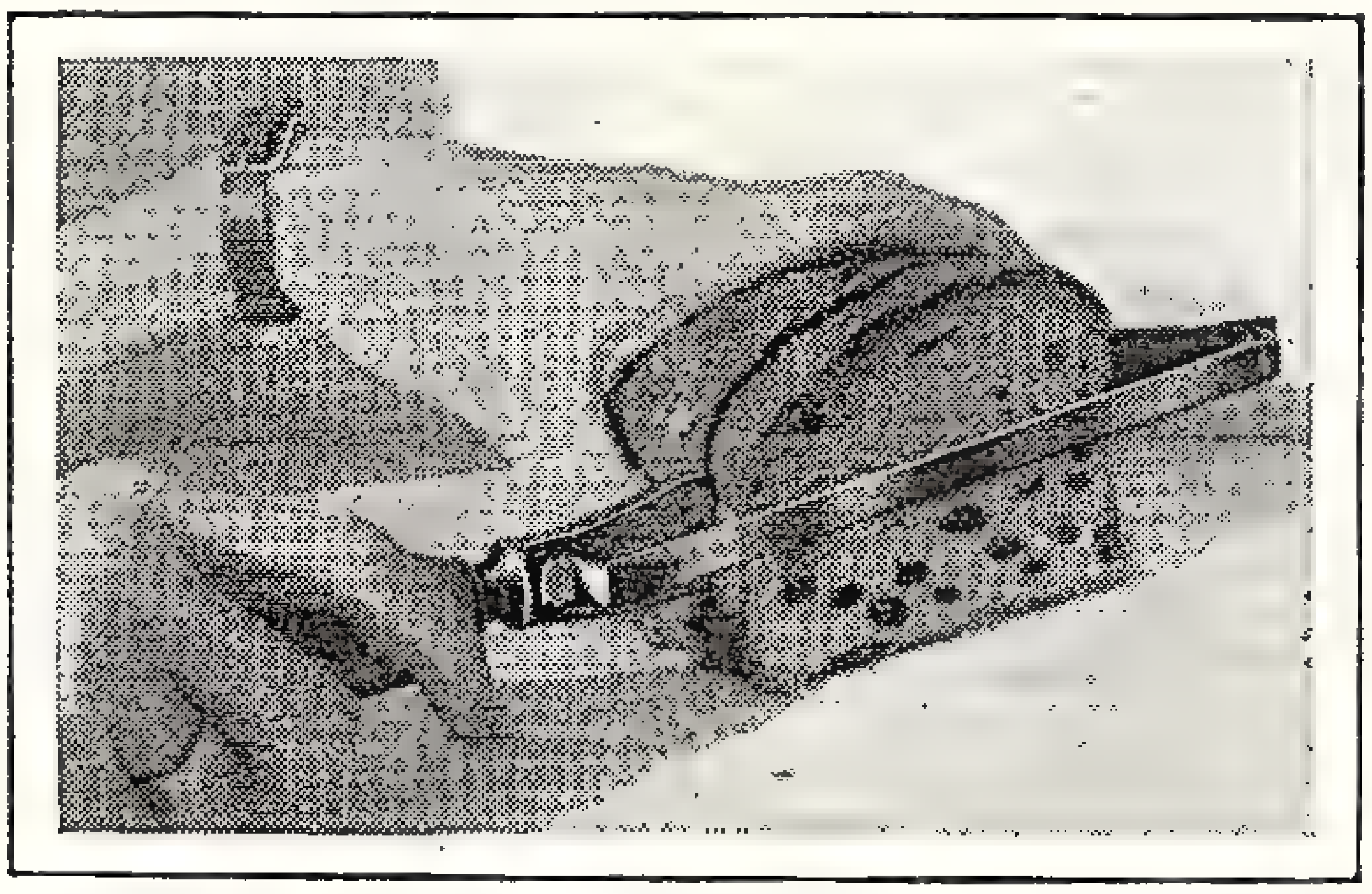
Laid down by navy plane in ground breaking ceremonies, trail of smoke across Golden Gate, San Francisco, showed spectators where the bridge would be erected. Costing over $35,000,000, the bridge has one span over mile in length.

Shock Absorber Springs Make Chair More Comfortable

YOUR rockerless porch or easy chair will be much more comfortable if you fit a couple of springs on the bottom, as illustrated in the photo at the right. The springs used in this case were taken from old Ford Model T shock absorbers. They form a cushion that gives the seat a flexible, springy, riding effect, like the seat of an automobile. The legs of the chair may be shortened slightly if you like your chair to be of normal height.

Bread Knife Cuts Slices Evenly

A FAIRLY heavy copper or brass strip soldered to the ends of the bread knife blade as illustrated below will make the cutting of even slices of bread a very simple task. Cut the strip to a width of about ½ in. and bend the ends so there is a space of ⅜ in. between the strip and the knife blade when it is attached. Solder or bolt the flat ends of the strip to the ends of the blade so that the slice of bread is guided by the space formed by the strip.

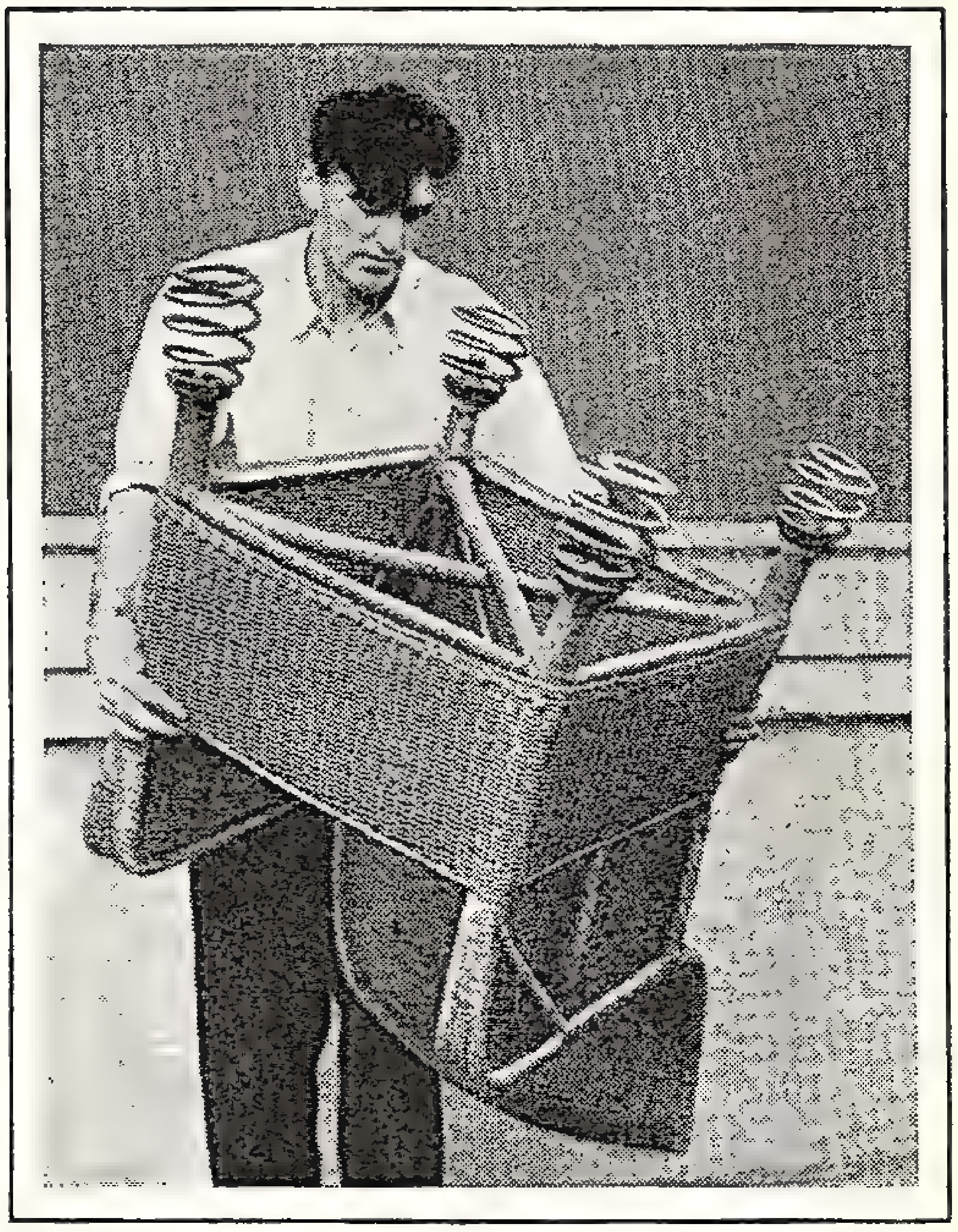


Copper strip is shaped as illustrated here and soldered to the side of the blade, leaving a space of ⅜ of an inch, which will be the thickness of the slices of bread.

Tire Cement Repairs Screen Holes

NOW that it's about time to get out the window and porch screens, you'll be wondering how you can patch up holes that have rusted in the wire. Here's how. When the small holes are first noticed, spread over them a film of ordinary tire cement. This forms a thin film that will keep out flies and other insects. When you have time, however, it's advisable to make a more permanent repair. When this time comes, simply wipe away the cement with a rag soaked in gasoline. The permanent patch is made with a small square of screen which is sewed over the hole with strong thread of wire from which the screen is made.

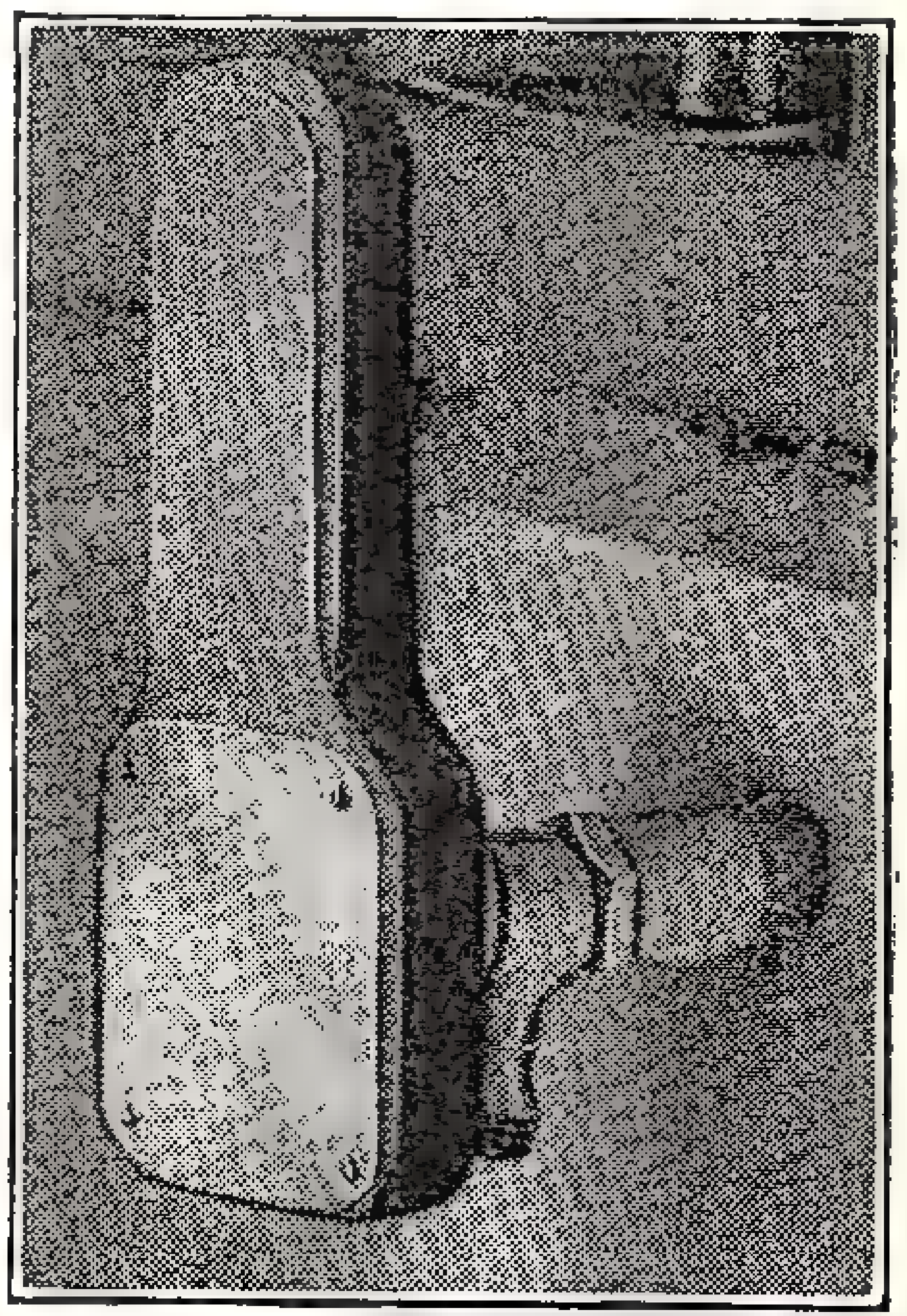
Here's a formula for a good universal cement: Take gum arabic, 100 parts by weight; starch 75 parts; white sugar 21 parts; camphor 4 parts. Dissolve gum arabic in water, likewise the starch. Mix, add sugar and camphor. Boil on a water bath until paste is formed, which, on coating, will thicken.

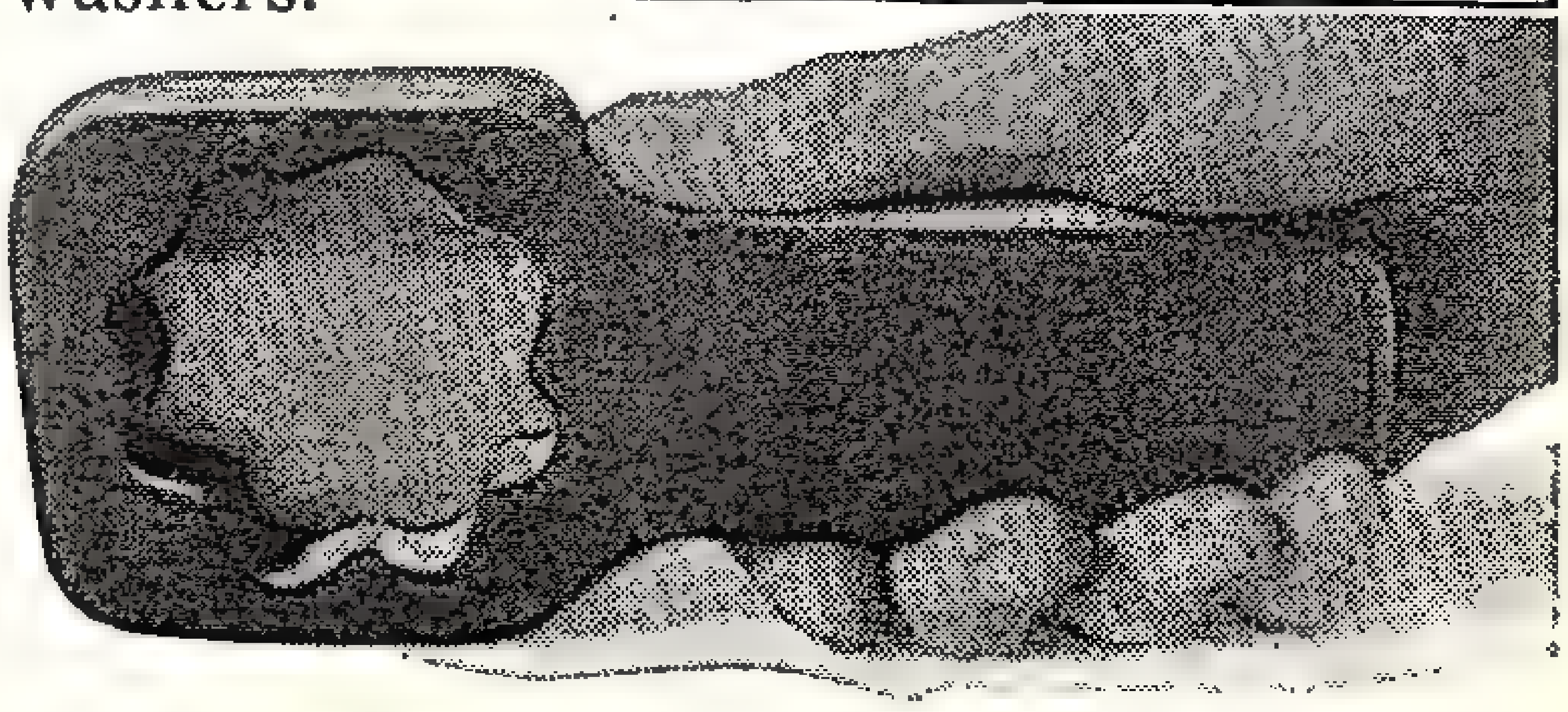


Springs from shock absorbers out of old Model T Ford are fitted onto end of chair feet to increase sitting comfort.

Grip to Tighten Faucet Handle

FAUCETS which turn very hard may be worked more easily by use of a grip cut from a 1 in. wooden block. Find the exact shape of the faucet handle and cut the pattern from the block with a coping or band saw. Shape a handle on the block then tack a tin back to one side as illustrated. Almost any leaking faucet may be tightened with this handy device so that it does not leak. If leaking is excessive replace washers.





With band saw cut out the board to shape of the faucet handle. Tack tin on back to hold the handle in place.

AT LAST—a Convertible

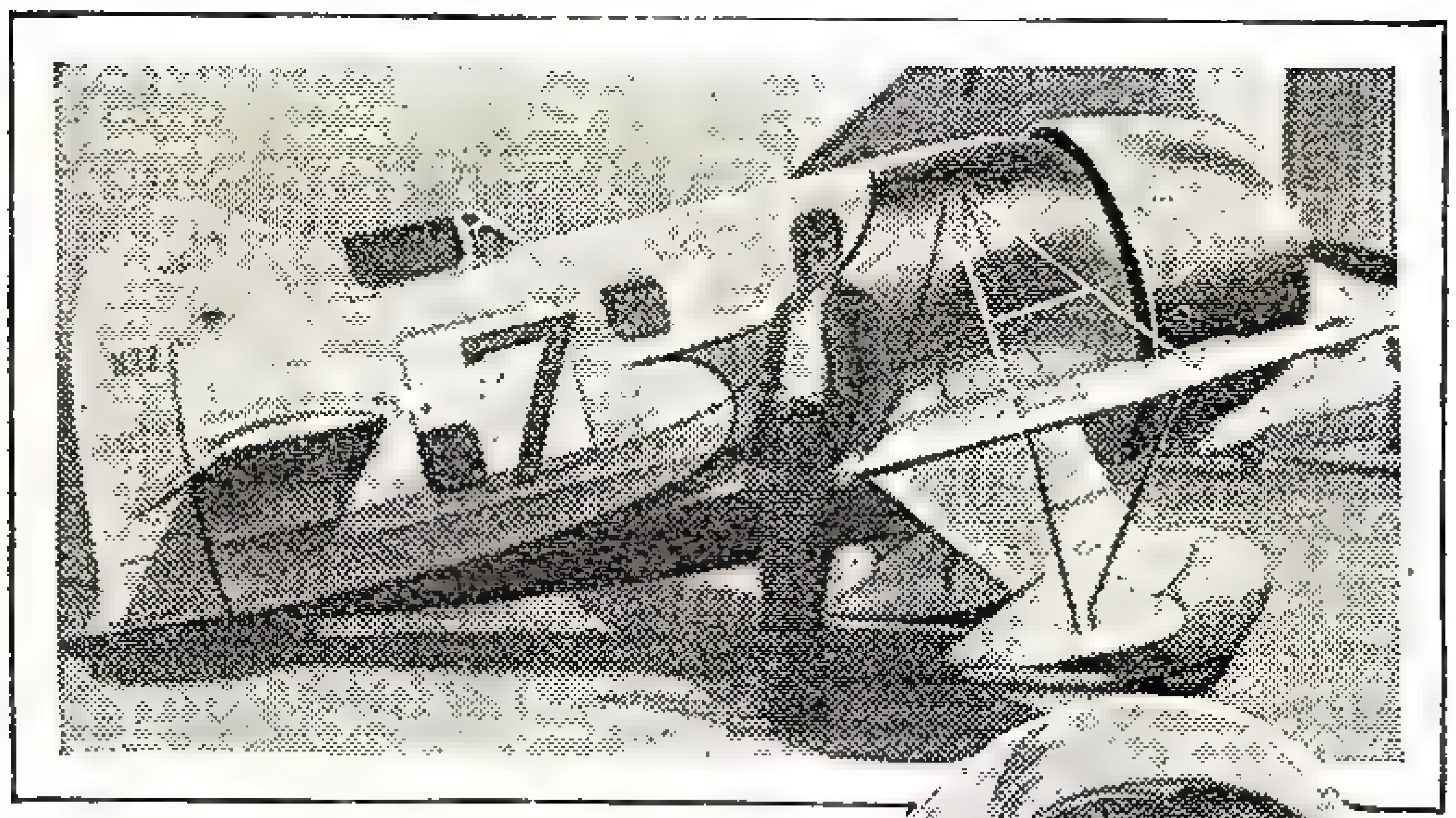
A STARTLING new vehicle which may be used in the air as a fast, sturdy airplane, and on the ground as a speedy, comfortable two-passenger coupe car, will shortly be available to aviation enthusiasts. The craft is really a streamlined mid-wing monoplane of 30-foot wing span, propelled by a 125-horsepower air cooled motor of regulation aircraft type. For ground use the ship may be quickly converted into a streamline car, simply by removing the wings and the rear end of the fuselage, leaving the closed cabin body resting on its three wheels, ready to drive through the streets. This transformation occupies about 20 minutes, by means of quickly detachable joints.

The development of the "Ascender," as the new ship is called, has taken many months of painstaking work in the selfsame Engineering Department which produced the fastest airplane in the world, Doolittle's "Flying Silo" which set a new world's record of 296 m.p.h. at the Cleveland air races last fall. The first Ascender has already been built and flown enough to prove itself a most unusual craft both in the air and on the ground.

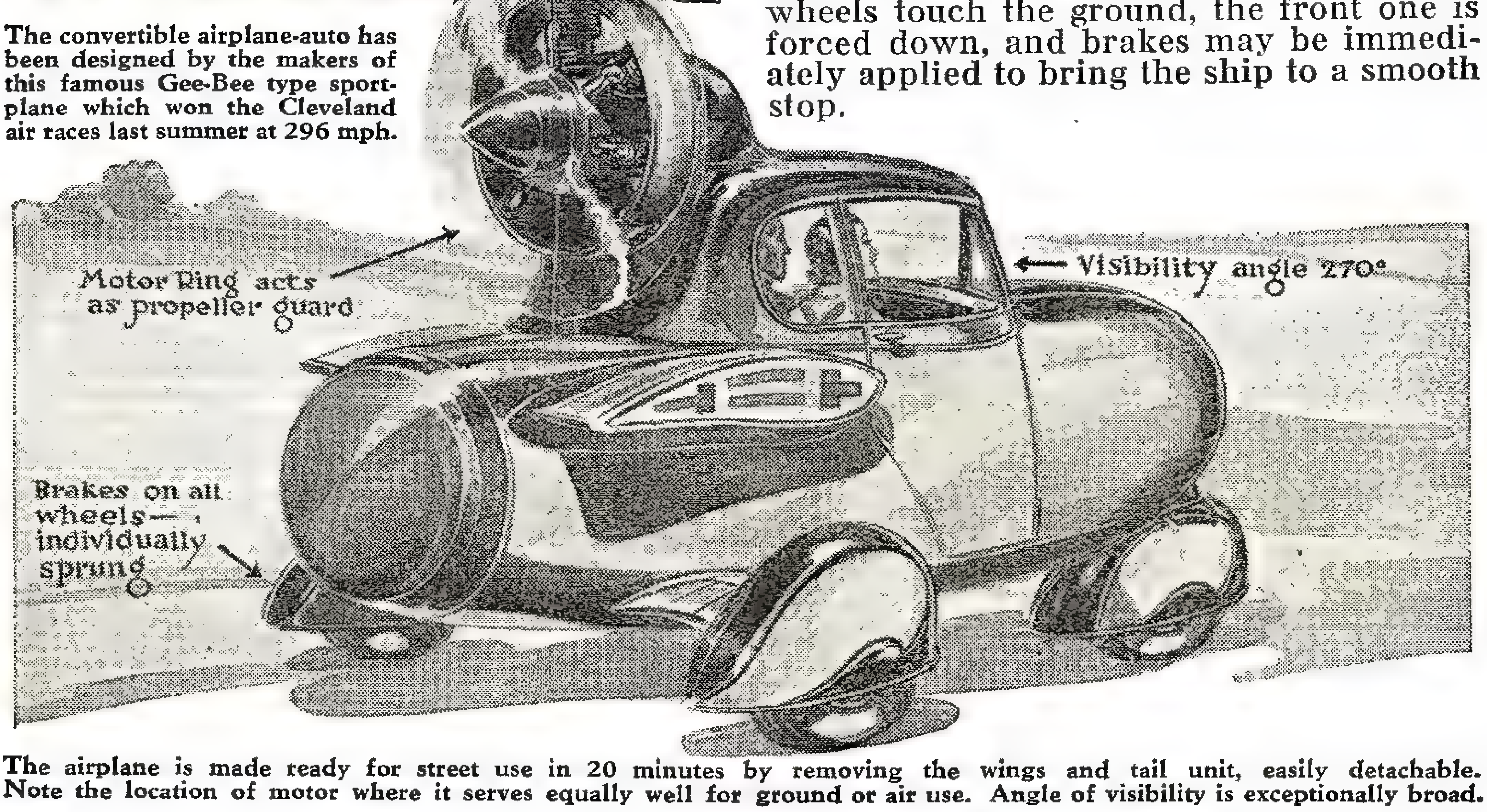
Control of this craft, in the air and on the ground, is by an automobile type steering wheel, a foot accelerator, and hand and foot operated brakes which act on all three wheels. While on the ground the ship rests on a three wheel landing gear, each wheel of which is equipped with internal brake and hydraulic shock absorber, as well as a large airwheel tire. The front wheel is steerable with the rudder of the ship, so that when the pilot moves the steering wheel to right or left, either on the ground or in the air, he guides the direction of his craft as he would a motor car.

On the takeoff there is no necessity of getting the tail up and balancing on two wheels while steering the ship down the runway by means of a rudder bar, as one is obliged to do in piloting the ordinary airplane. In this new craft, one merely sits behind the wheel, opens the throttle, and drives the ship down the field or runway as one would a car, with no possibility of "nosing over" even if brakes are applied suddenly, or from obstructions such as bumps, ditches, or soft spots. When sufficient speed has been attained the driver has merely to pull the wheel slightly toward him, whereupon the front wheel leaves the ground and the ship "takes the air."

Landing the Ascender is a simpler task than in the ordinary airplane. It is no longer necessary for the pilot to judge his speed and distance so that the ship will stop flying directly over the spot in the field where he wishes to land. With this craft, he need merely throttle the engine, point the nose down until the ship assumes a normal glide toward the field and set the ship onto the ground at a speed much greater than is safely possible in the ordinary airplane. As soon as the two rear wheels touch the ground, the front one is forced down, and brakes may be immediately applied to bring the ship to a smooth stop.



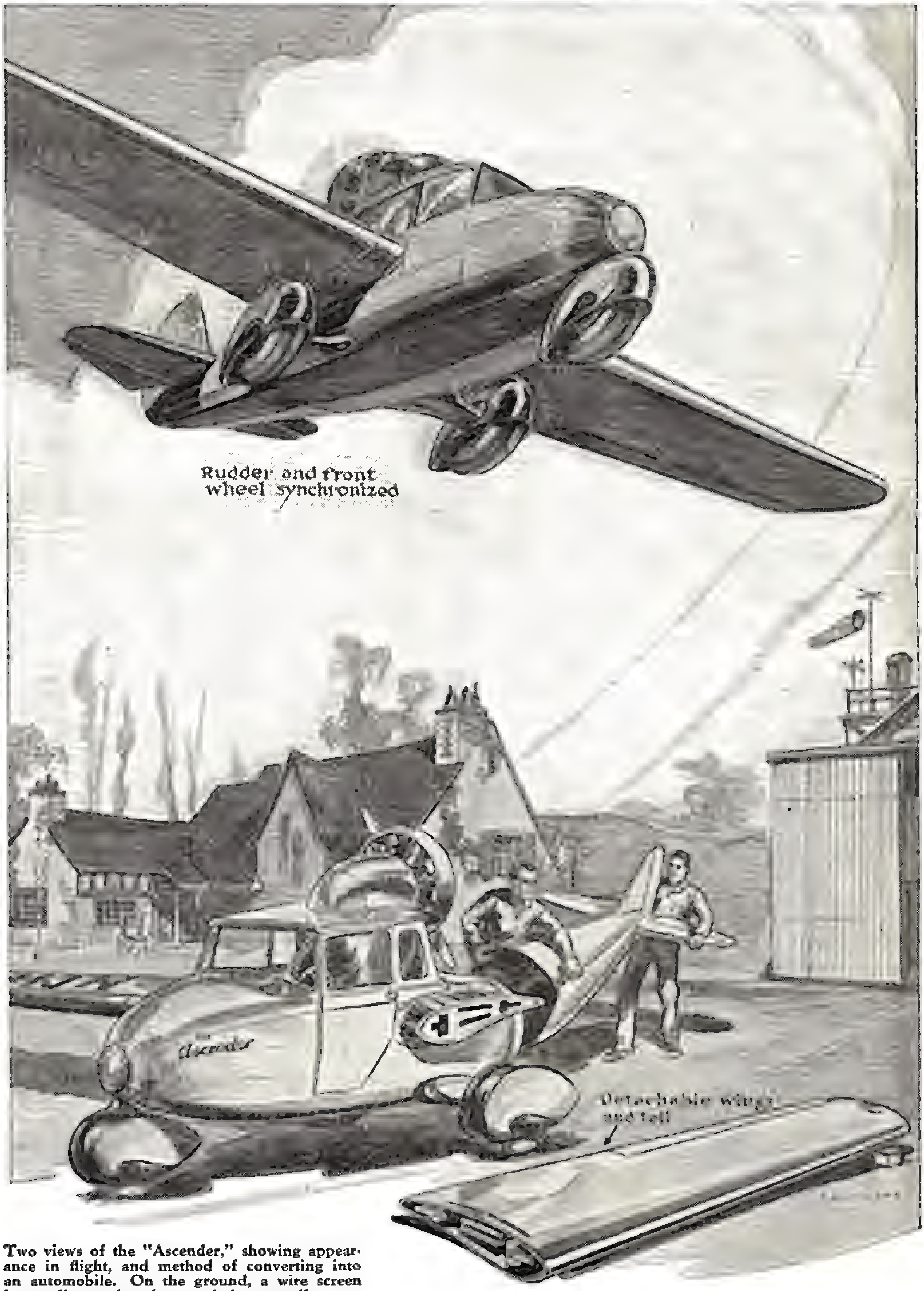
The convertible airplane-auto has been designed by the makers of this famous Gee-Bee type sportplane which won the Cleveland air races last summer at 296 mph.


Motor Ring acts as propeller guard
Visibility angle 270°
Brakes on all wheels—individually sprung

The airplane is made ready for street use in 20 minutes by removing the wings and tail unit, easily detachable. Note the location of motor where it serves equally well for ground or air use. Angle of visibility is exceptionally broad.

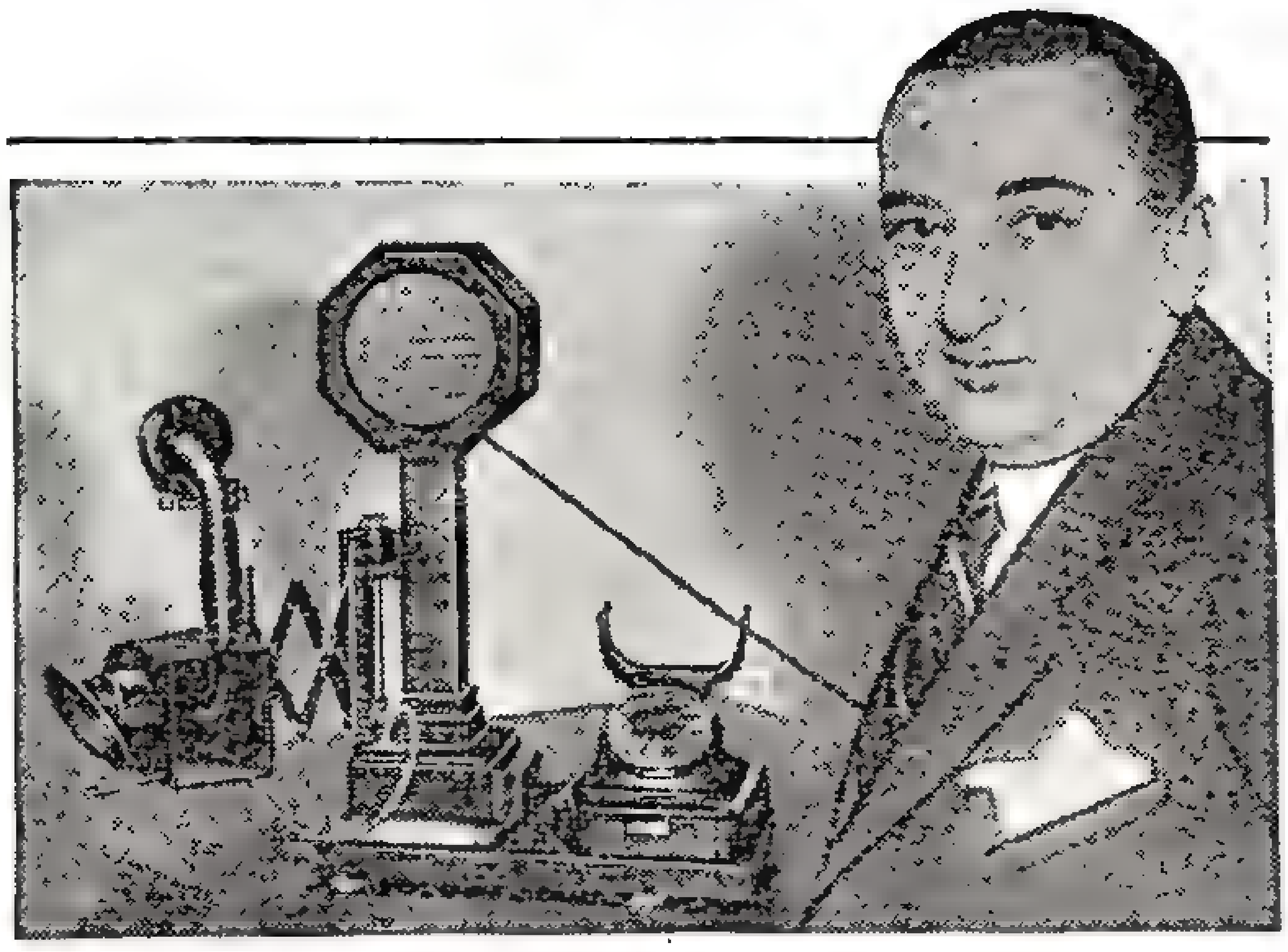
AUTO-PLANE

by THEODORE A. HODGDON


Rudder and front wheel synchronized
Ascender
Detachable wings and tail

Two views of the "Ascender," showing appearance in flight, and method of converting into an automobile. On the ground, a wire screen is usually employed around the propeller as a safeguard, though the arc of the blade is well within the confines of the car.

Mike and Speaker on Phone Make Talk More Convenient



New telephone mike and loudspeaker which amplifies incoming and outgoing voice, eliminating necessity of holding transmitter to face when speaking or listening to conversation.

THE latest gadget for attachment to your telephone is an amplifier and loudspeaker which permits you to speak and listen without holding the transmitter up to your face.

As shown in the photo at the left, the transmitter-receiver piece is hung on a special device which feeds into an amplifier that boosts both the incoming and outcoming voice. The former issues from a loudspeaker, while the latter is picked up by a super-sensitive microphone.

Dialing is accomplished in the usual manner. The device is the invention of Hans Schmidt, a Berlin Engineer, who labored for five years on the development of his creation.

Smoke Cuts Daylight 14 Per Cent

FOURTEEN per cent of a year's daylight in the city of Baltimore, Maryland, is thrown away by allowing smoke to get into the city's air, according to a Public Health survey recently conducted.

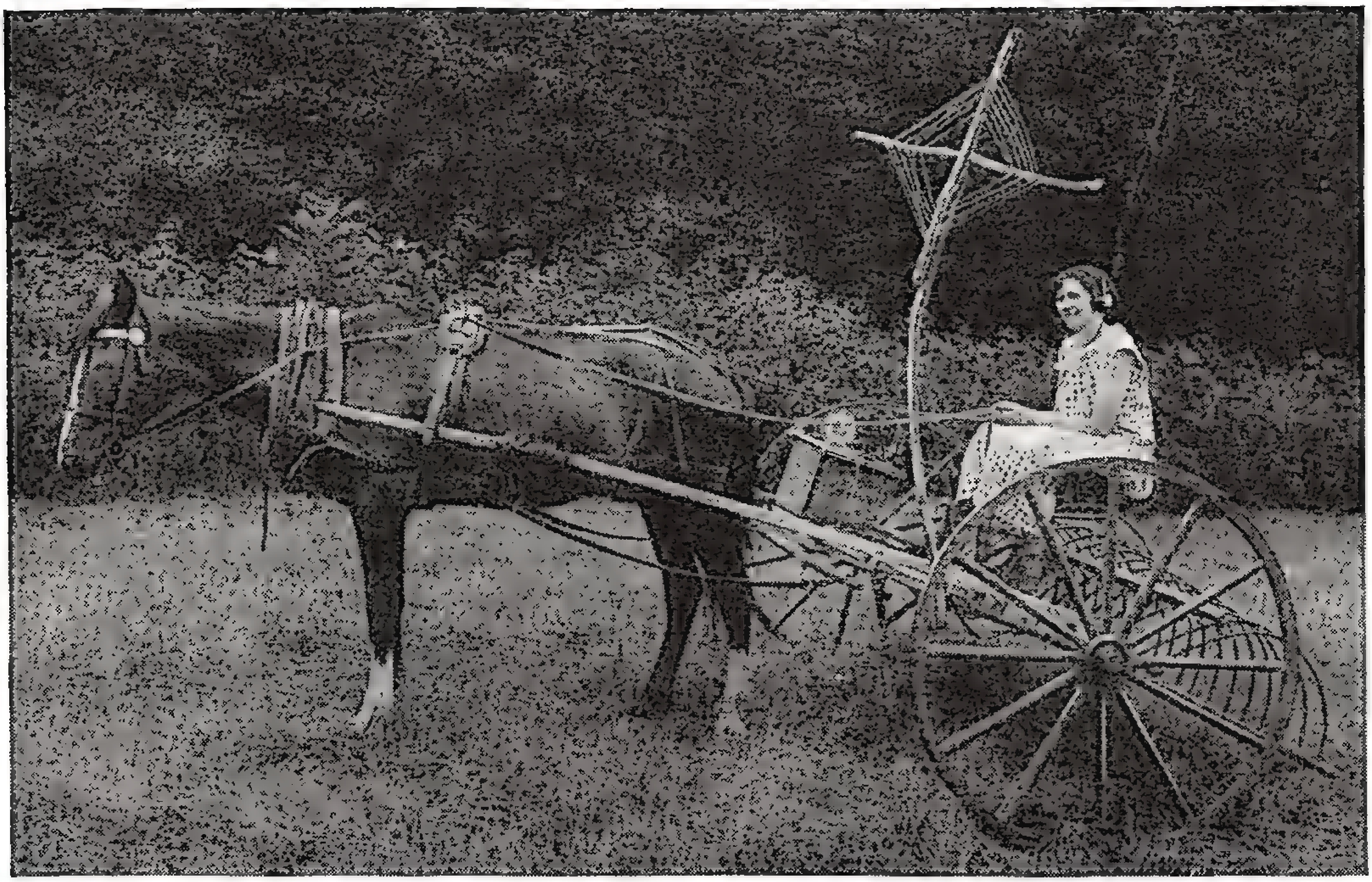
To make the measurements, one photoelectric cell sensitive to light was set up on a building inside the city and connected with electric apparatus to record the illumination minute by minute throughout the day. The conclusion was that city smoke causes very substantial losses of daylight and boosts light bills.

Radio Modernizes the Old Hayrake

THE old hayrake has gone modern, and is now on par with the automobile. Take a look at the photo below and see what happened when a young fellow with a radio bee in his bonnet took it upon himself to modernize the rake.

The installation of the radio was effected when a young lady from the city volunteered to help rake the timothy while on her vacation at a Butler, New Jersey, farm. To keep her entertained, the farmer's 12-year-old son fastened his home-made radio receiver to the rake and wound a loop antenna on a couple of sticks.

The signals came in clear and strong over the head phones during working hours.



The old fashioned hayrake has been modernized by installation of a radio to keep young lady city vacationer from being bored while she assists Farmer Jones in harvesting his crop of timothy. Note the loop antenna wound on the cross piece.

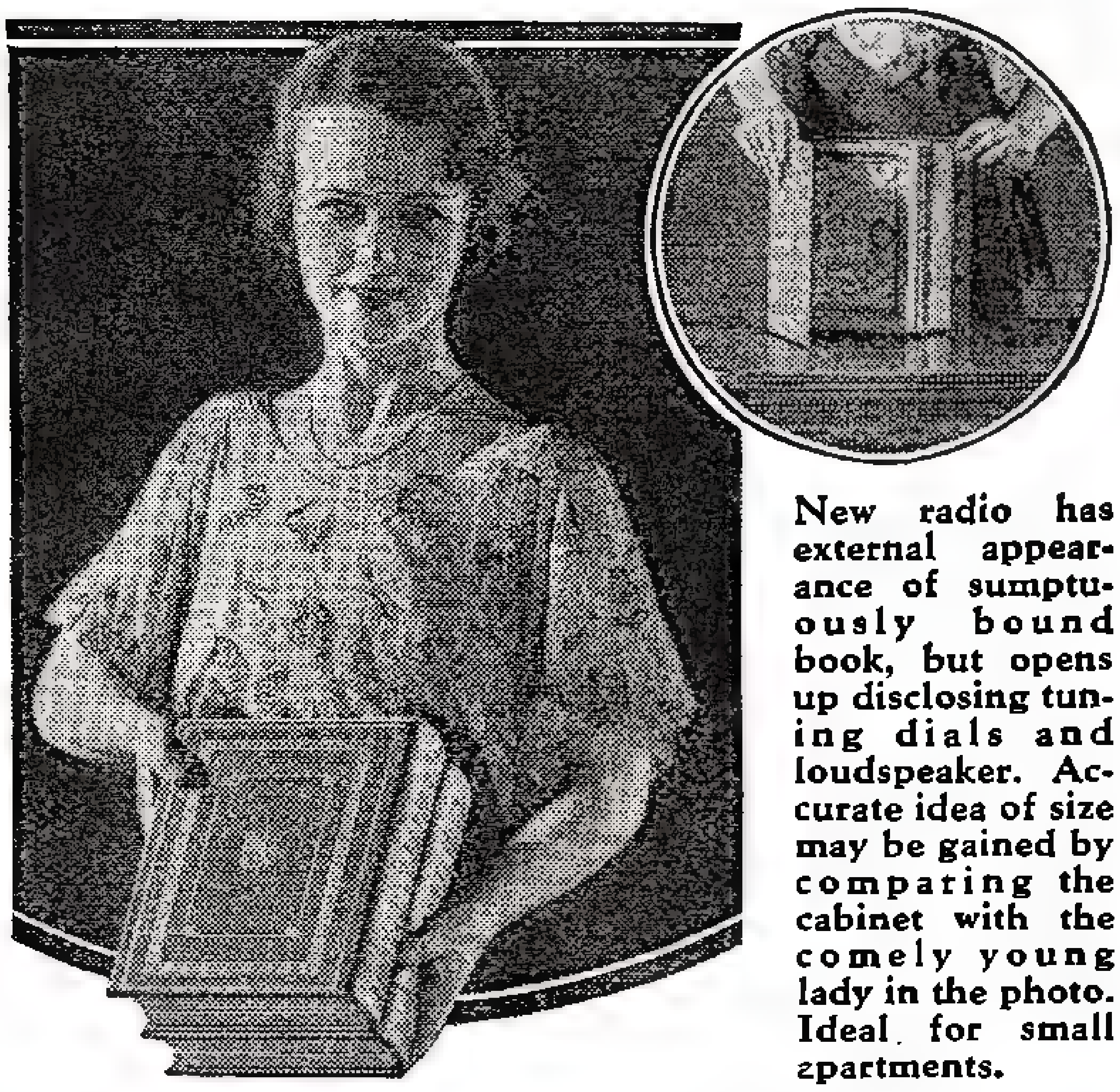
Oxygen Chamber Taken to Dying Mayor Cermak by Plane

COMPLICATIONS which developed in the lungs of Mayor Cermak of Chicago after he had been shot in Miami necessitated the administration of oxygen in a hurry. Unfortunately there was no equipment for this in Miami, so an oxygen tent had to be rushed from New York, packed in the passenger compartment of a plane as illustrated at the right.

The feat was a marvel of aerial medical rescue. The tent arrived and was set into operation immediately, but gangrene later developed in the Chicago mayor's lung and shortly after he died.

Oxygen equipment employed in attempts to save life of Mayor Cermak is packed in plane for shipment to Miami.

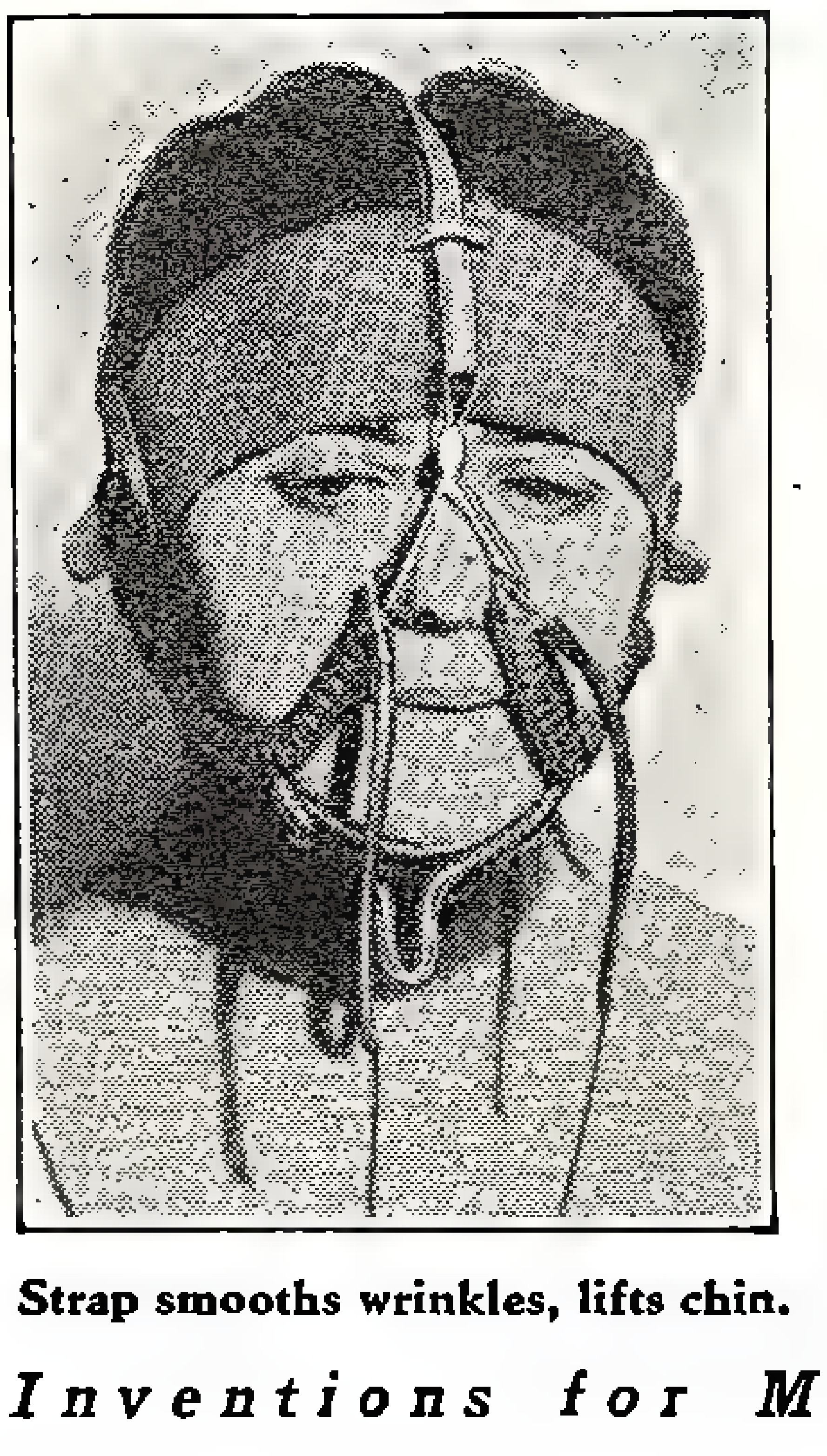
Radio Looks Like Couple of Books



New radio has external appearance of sumptuously bound book, but opens up disclosing tuning dials and loudspeaker. Accurate idea of size may be gained by comparing the cabinet with the comely young lady in the photo. Ideal for small apartments.

A NEW radio receiver now on the market has the appearance of a pair of gorgeously bound books, as shown above. One lid opens up to give access to the tuning and volume knobs and the loud speaker.

Face Harness for Milady's Beauty

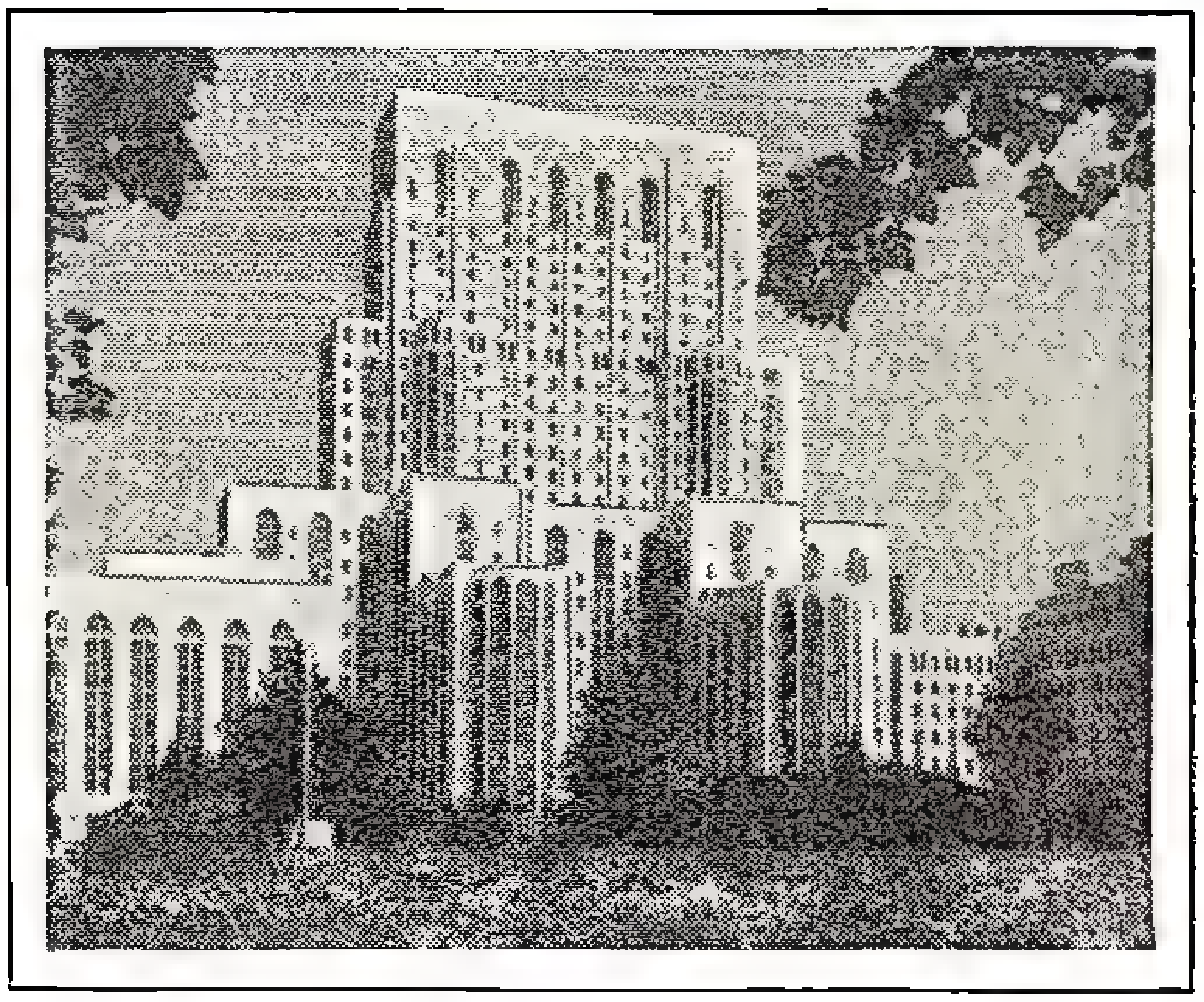


Strap smooths wrinkles, lifts chin.

A NEW facial harness now on the market lays claim to the ability to improve milady's beauty. How the device is worn is illustrated in the photo at the left. Sagging chins are lifted and unbecoming wrinkles are smoothed out around the lips, cheeks and forehead, manufacturers claim. It is worn overnight, removed in morning.

Hospital Model Wins Gold Medal

A MASTERPIECE of the modelmaker's art is the prize-winner of the 48th annual exhibit of the architectural league held recently in New York. Patterned from the New York hospital, the model, shown below, was the handiwork of a prominent Boston architectural firm, and won the gold medal for the orderly arrangement of the parts, for the excellence of the plan and the originality of design. Model shrubbery and trees further heighten the illusion.

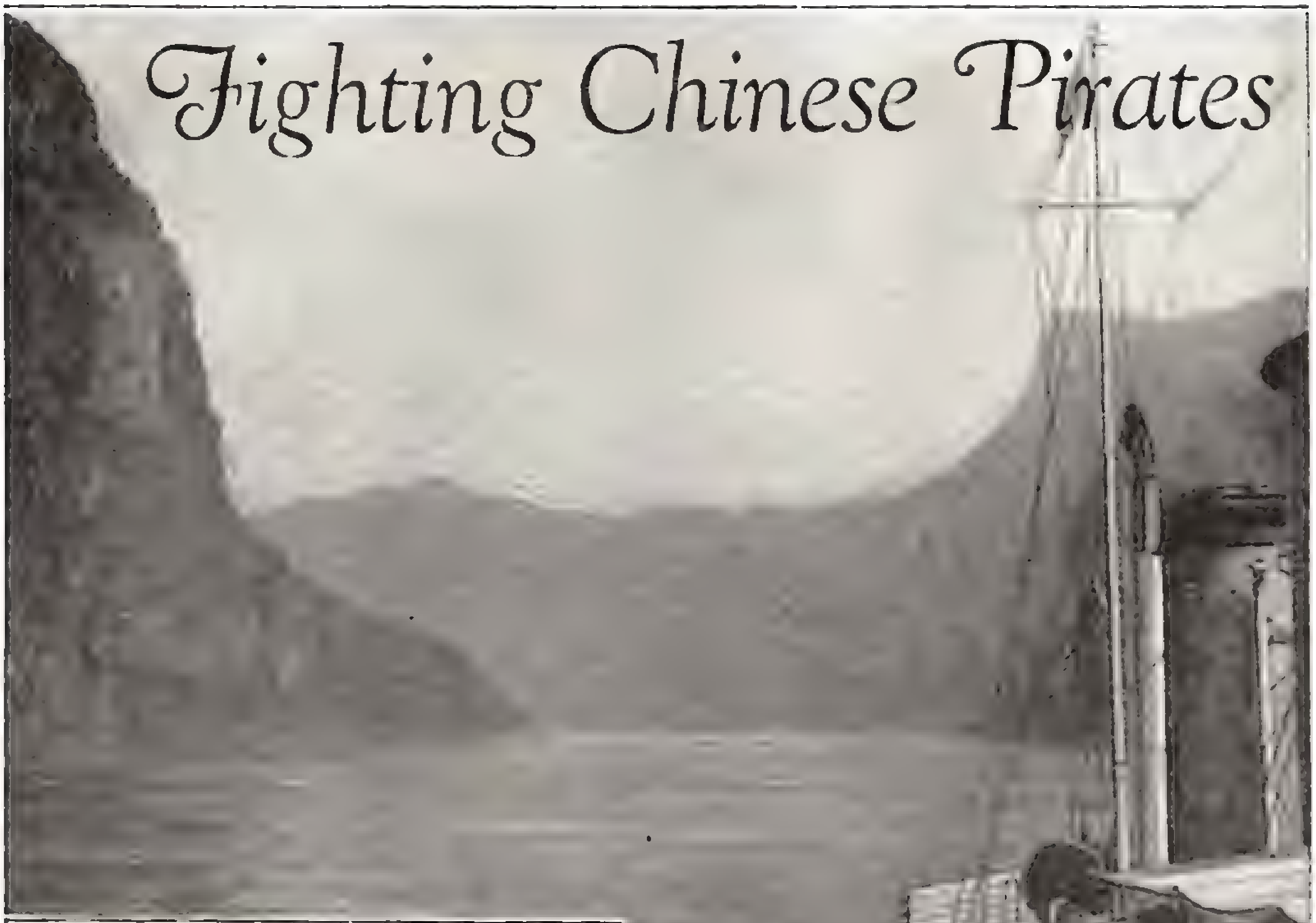


Model of New York hospital which was awarded gold metal in 48th annual exhibit of the architectural league.

Stars Say This Is Year 1940

ASTRONOMICAL reasons for regarding this year as really 1940 instead of 1933 are presented by a German professor. Since historians admit that the exact date of Christ's birth is unknown, the professor believes that his calculations, made from star data and biblical history, show the early winter of B. C. 7 the most probable date, so that the present year really is the 1940th after the birth of Christ instead of the 1933rd.

Fighting Chinese Pirates

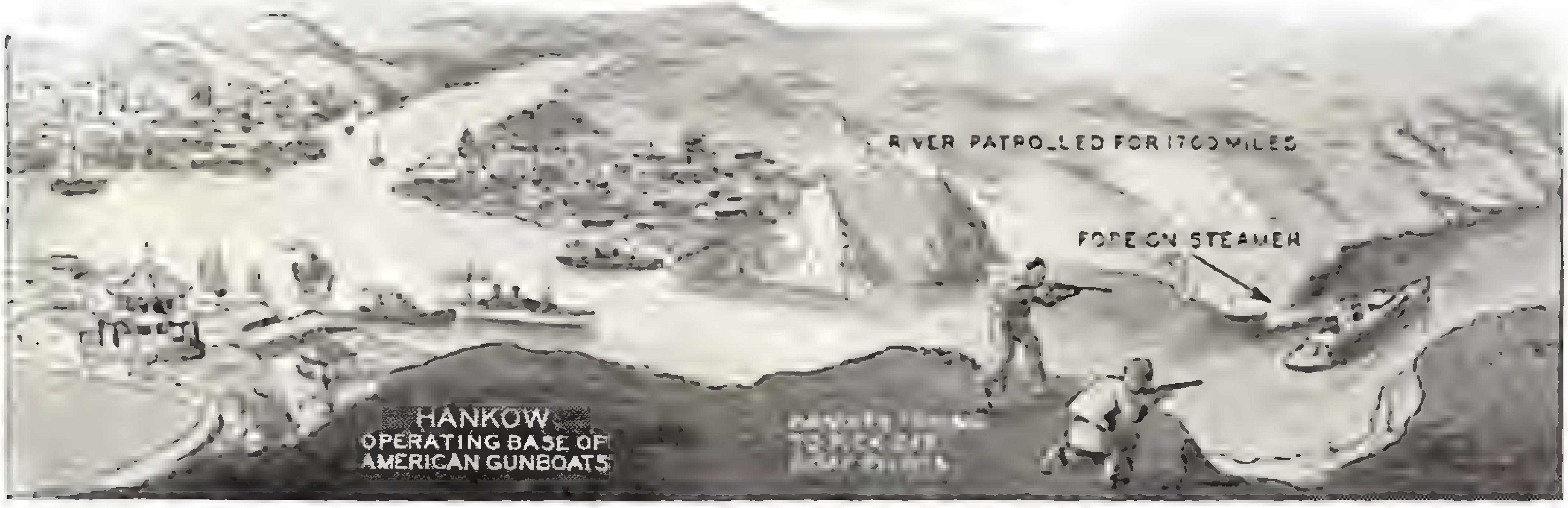


The beginning of the tremendous gorges of the Yangtze—noted for their dangers because of the swift rise and fall of the waters. A French gunboat was once left stranded 24-ft. above the river when waters fell that distance in a day.

Looking down on the mighty Yanztze, 1500 miles upstream from Nanking. The prow of a British gunboat is seen in the foreground. The patrol is carried into the rich province of Szechwan, which has three-fourths the population of the United States.

WHILE riding through an almost endless succession of dangerous rapids, whirlpools and currents in the Yangtze River, about 160 miles above Hankow, a merchant vessel operated by an American, named Captain Baker, suddenly went aground. It was night-time and a stone's throw away could be dimly seen the craggy outlines of the shore.

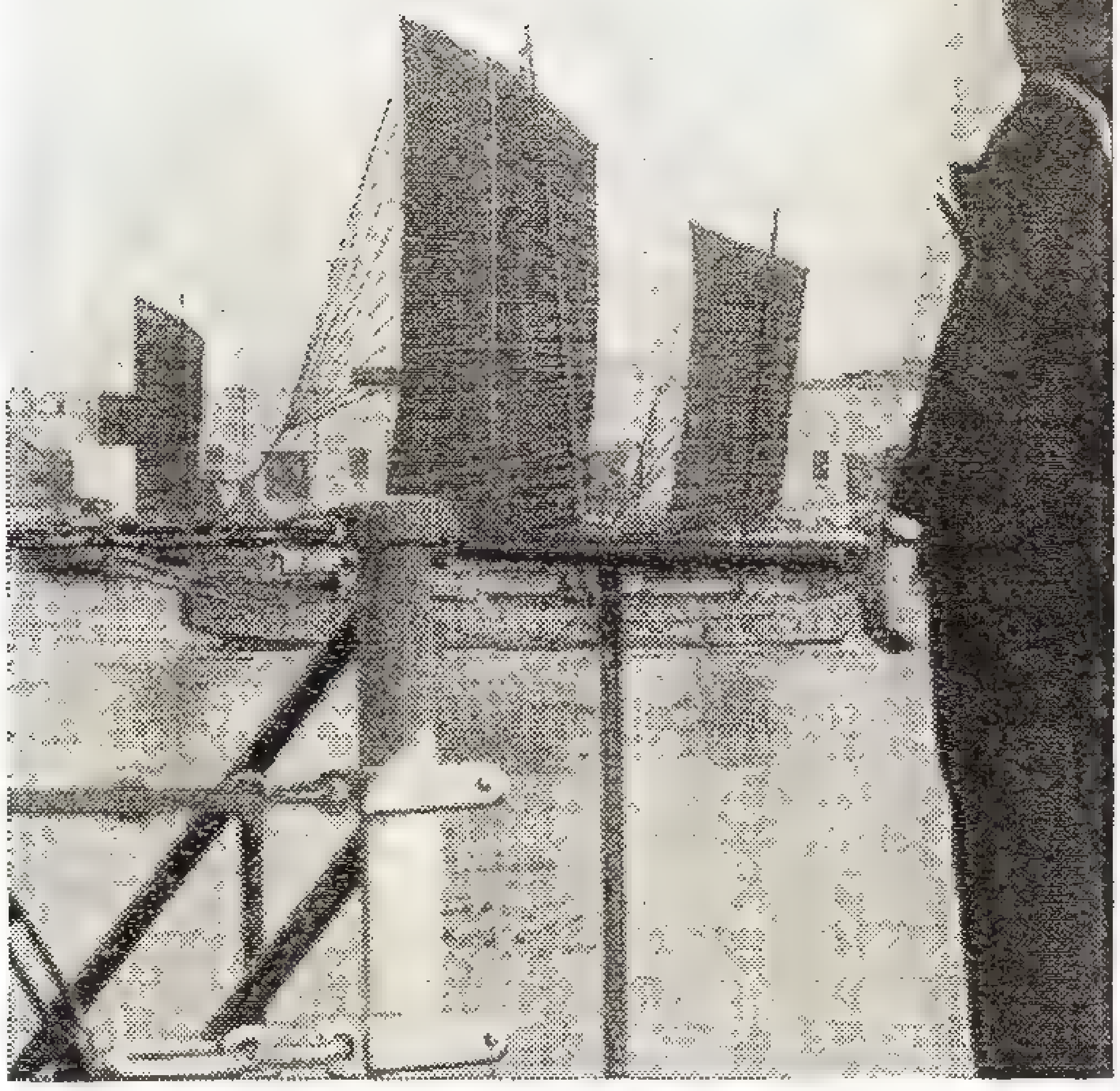
Nine times out of ten such an accident results in a bandit attack in this remote section of China. But hardly had the American given the order to his Chinese crew to arm themselves when things began to happen. Not a single warning sound was heard and yet, within five minutes'



with U. S. Marines

by JOHN CLOVELLY

Seven Yankee gunboats, patrolling the Yangtze river in conjunction with those of other nations, wage constant war against the bandits who infest this district which boasts one-third of the world's population. Little known activities of this romantic branch of the foreign service are described in this article.



U. S. tar watching a junk suspected of being one of a pirate group. Construction of the junk is typical; sails are of bamboo matting. Note the control ropes of the sail.

time, every coolie had been disarmed and bound by as villainous a gang of cutthroats as Baker had ever seen. Armed with sawed-off shotguns and wearing filthy rags, they looked as if they would commit murder for a dollar.

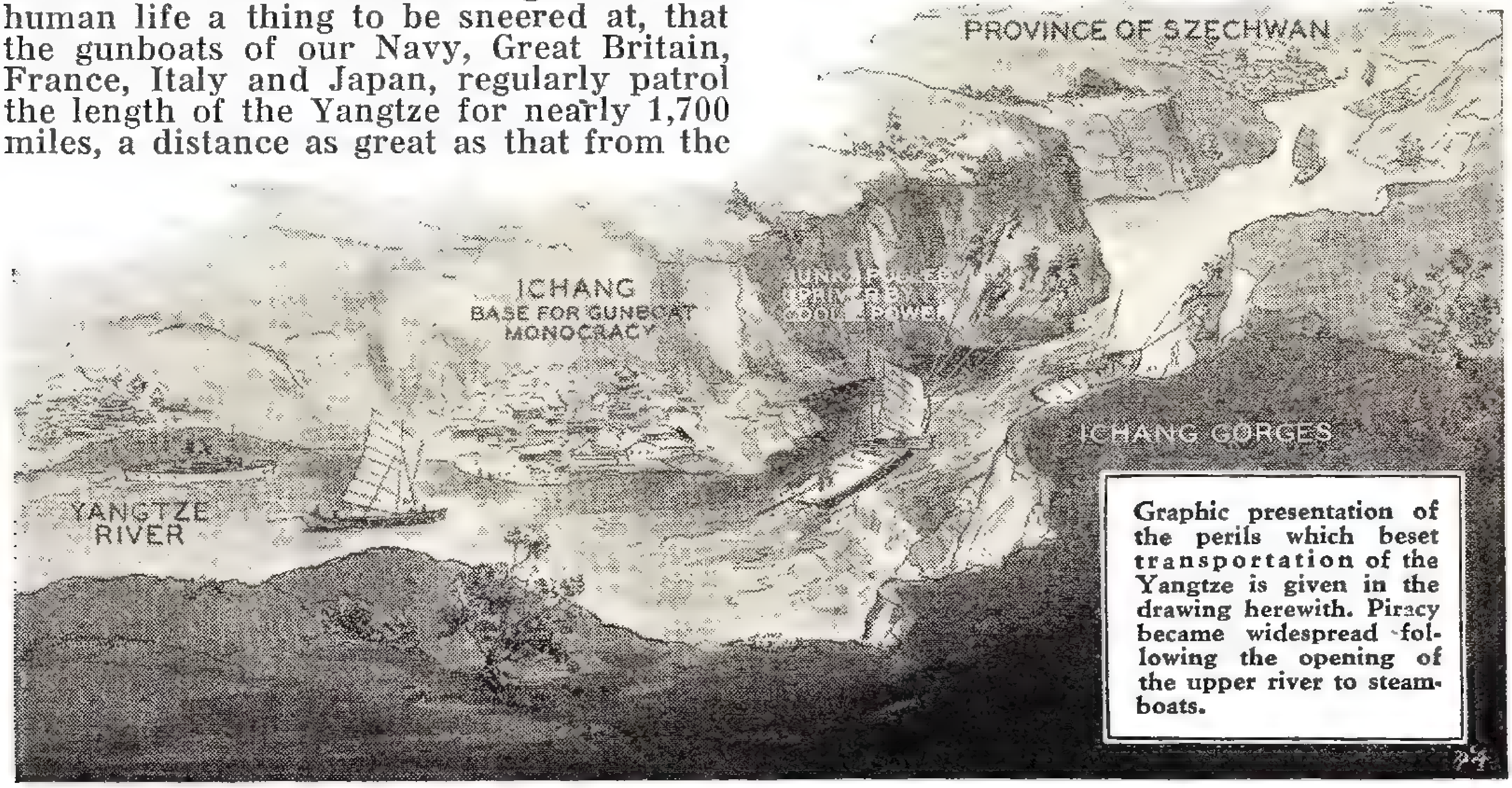
However, their leader calmly announced that he would release the American upon receipt of two million dollars! Of course he did not make good on this fantastic demand, but his thugs seized Baker's boat containing perhaps $10,000 worth of cargo, and kept him prisoner for three months. At which time, thanks to friends, Baker raised a couple of thousand dollars and was freed.

Such instances happen again and again in the region of China's mightiest river, which rises in the snow-capped mountains of Tibet and winds its way irregularly in a generally seaward direction for nearly three thousands miles to the ocean, emptying into the Yellow Sea a few miles from Shanghai.

Small wonder, what with trade transactions such a tremendous gamble and human life a thing to be sneered at, that the gunboats of our Navy, Great Britain, France, Italy and Japan, regularly patrol the length of the Yangtze for nearly 1,700 miles, a distance as great as that from the mouth of the Mississippi to Hudson Bay, Canada.

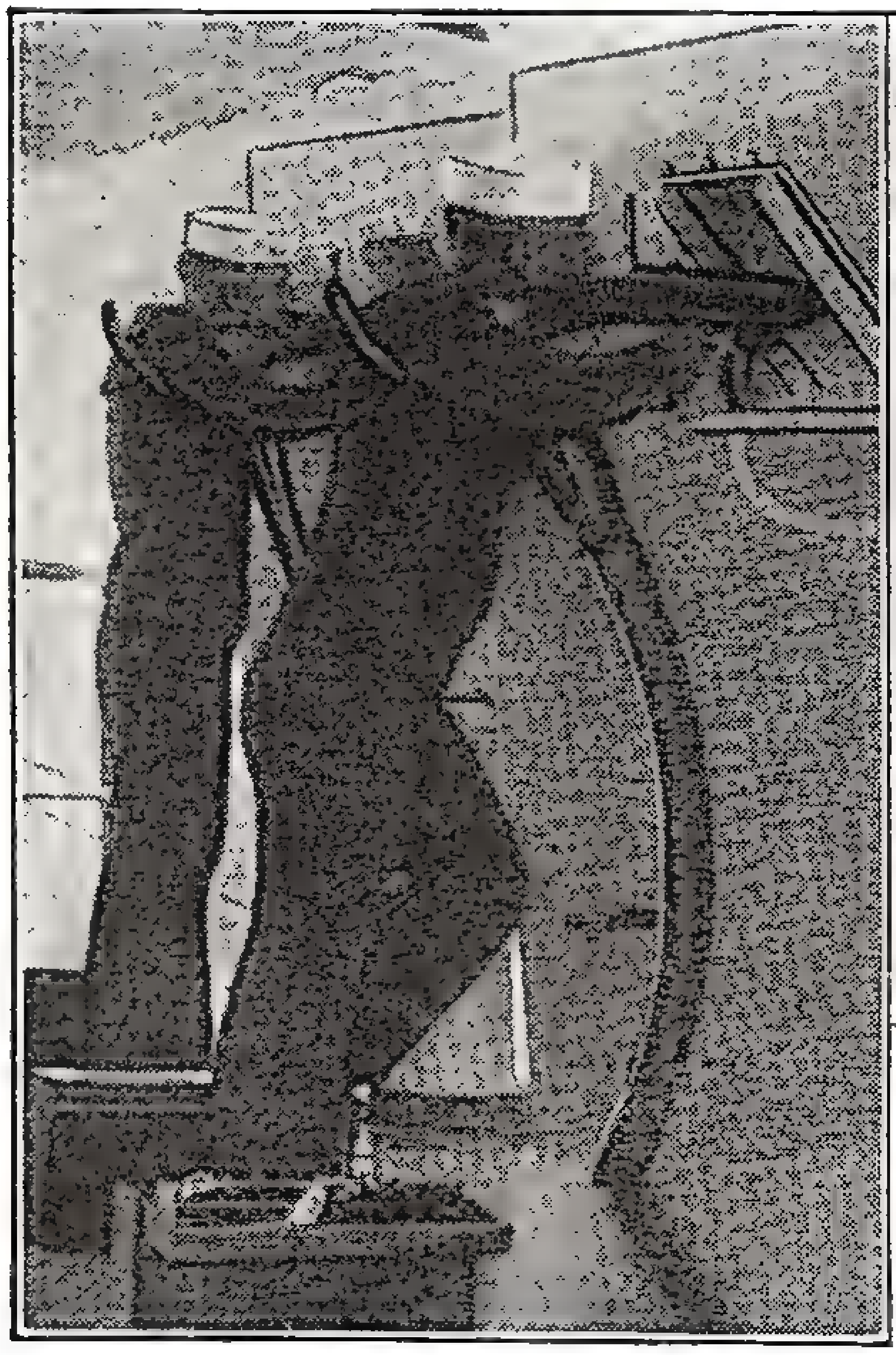
The American patrol force consists of seven regular gunboats and, according to the seriousness of the emergency, any one of four "spare" gunboats. Each vessel carries three to four ship's officers, one doctor, and a crew of about 50 enlisted men. The boats are distributed throughout the Yangtze region as follows:

At Hankow, 600 miles up the river, is the regular operations base for the *Luzon,*



Graphic presentation of the perils which beset transportation of the Yangtze is given in the drawing herewith. Piracy became widespread following the opening of the upper river to steamboats.

Special Gun Swivels Enable Naval Marksmen to Repel Sudden Attack



Note the peculiar gun swivels. They permit Navy tars to swing guns in a wide angle, always in firing position.

U. S. sailors fraternizing with crew of junk, who are as likely as not to be pirates.

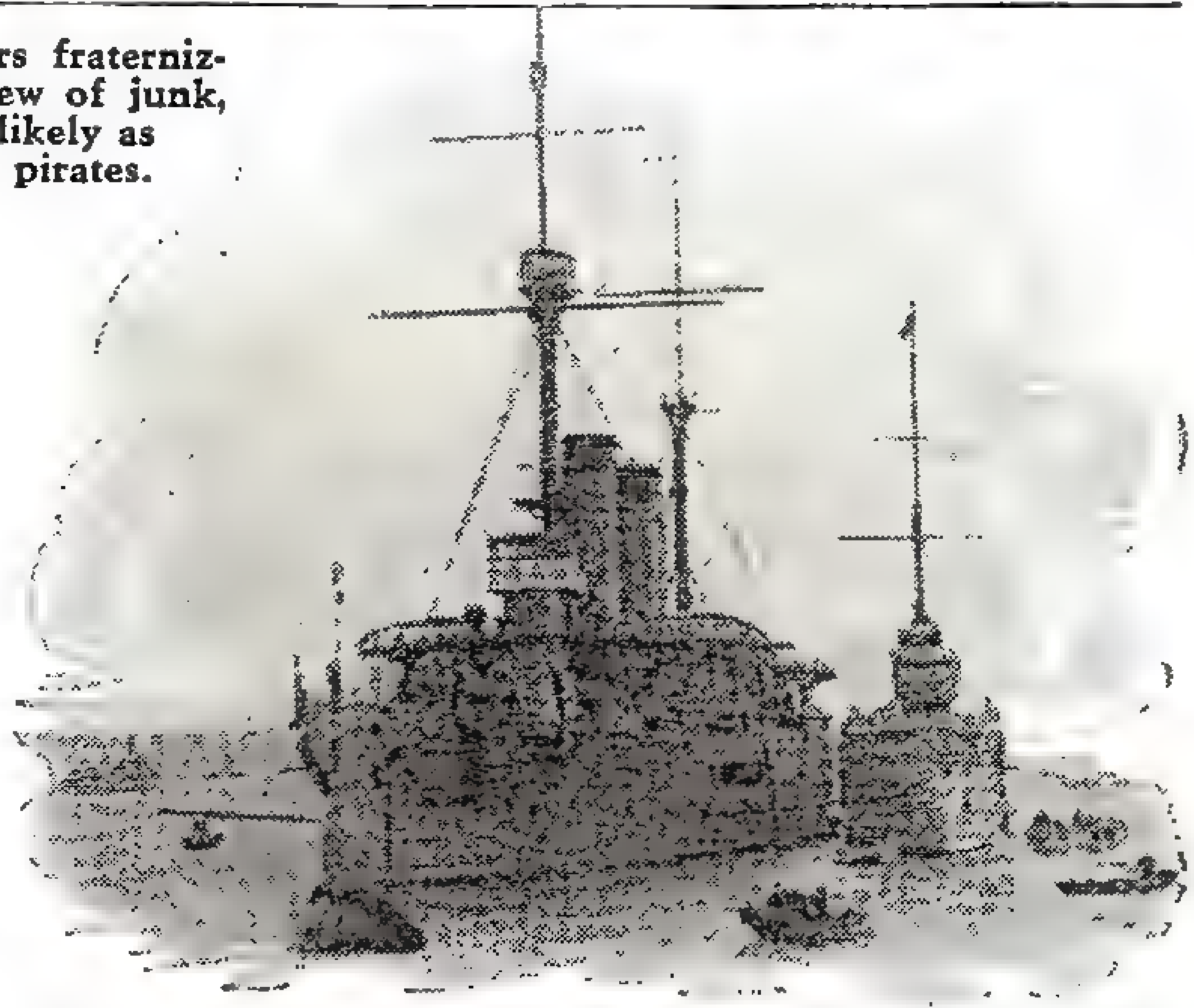
flagship of the force, under command of Rear Admiral Yancey S. Williams, besides the gunboats *USS Palos, Tutuila* and *Cahu;* 500 miles up the river is the base for the gunboat, *Panay,* at Mowangtsui; at Ichang, 1,000 miles up the Yangtze, is the gunboat *Monocacy;* and at Chungking, 1,500 miles up the river, is the gunboat, *Guam.* At Nanking, 150 miles up the Yangtze, no regular patrol boats operate, but in emergency cases any one of the following seagoing gunboats is utilized: either the *Fulton,* the *Asheville,* the *Tulsa* or the *Sacramento.*

The British maintain about 12 gunboats with similar personnel and procedure as the Americans; the Japs have about the same number; the French, three boats, and the Italians, one.

Untold millions of dollars worth of foreign capital are tied up in industries located in the Yangtze region patrolled, which region, by the way, contains about a third of the world's entire population. The city of Hanyang, the Pittsburgh of China, with its towering steel mills, adjoins Hankow, but is separated from it by the Han River and diagonally across the Yangtze on the south bank eight miles away is Wuchung; geographically these three cities are not unlike Manhattan, Brooklyn and Jersey City.

That romance and adventure are not alone the lot of those who "go down to the sea in ships," but also of those who go up the Yangtze in gunboats, is more readily understood when the nature of their tasks is better known.

Well advertised have been the Volga boatmen, famous in Russian lore. But when one learns of the endless toil of the Chinese in "tracking" junks throughout the countless years in navigating that part of the Yangtze River known as the "gorges," more than a thousand miles upstream, one wonders how indistinct is the line which divides man and beast.



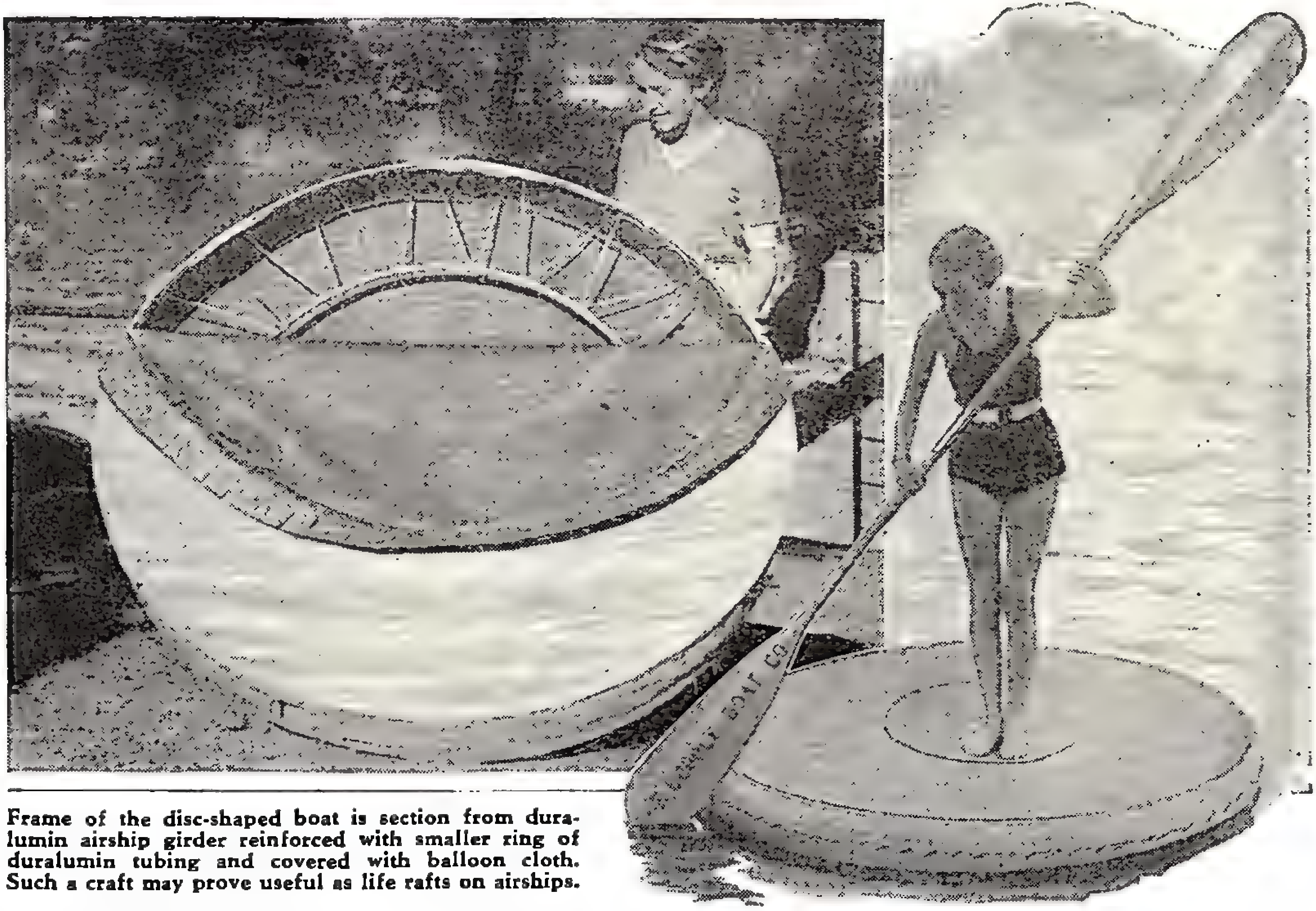
Japanese gunboat used in Yangtze patrol. Great Britain, France and Italy also cooperate in defending the river.

From Ichang, the head of navigation for moderate draft steamers, 1,000 miles up the river, and 400 miles above Hankow, which is the upstream port for ocean-going steamers, the river enters the famous Ichang gorges—a succession of dangerous rapids, whirlpools and currents. From Ichang to Chungking, a city of 300,000, the river port of the rich province of Szechwan, the distance is 358 miles. The stretch from Ichang to Wanhsien, at the upper gorges, has more than its share of "human interest."

The American shallow draft gunboats, *Palos* and *Monocacy,* not only negotiate these dangerous waters year in and year out, but proceed 200 miles further upstream from Chungking to Suifu, at the confluence of the Yangtze and Min Rivers,

(Continued on page 143)

Disc-shaped Raft Has Airship Ancestry



Frame of the disc-shaped boat is section from duralumin airship girder reinforced with smaller ring of duralumin tubing and covered with balloon cloth. Such a craft may prove useful as life rafts on airships.

A NOVEL disc-shaped type of boat developed by an Akron, Ohio, inventor is a direct descendant of the *Akron* and *Macon*. As shown above, the unique craft has a ring-shaped frame made from a duralumin airship girder section, and reinforced with a smaller ring bent from duralumin tubing.

This framework is covered with balloon cloth like that used in blimp envelopes. The completed craft is shaped like a thin drum or flattened bubble.

From this boat was developed several other types similar in construction. One, a collapsible form that can be carried about in an airplane cockpit or motor car, has a ring of rubber and fabric tubing that can be inflated with a tire pump till it is rigid as metal. The inventor believes craft of this type can be utilized as life rafts on large airships.

Why Flies Prefer White to Black

RESTAURANT managers who want house flies to keep off their tables should use colored table cloths instead of white ones and people who want house flies to avoid them should wear dark clothes instead of light, according to a report given to the American Physical Society.

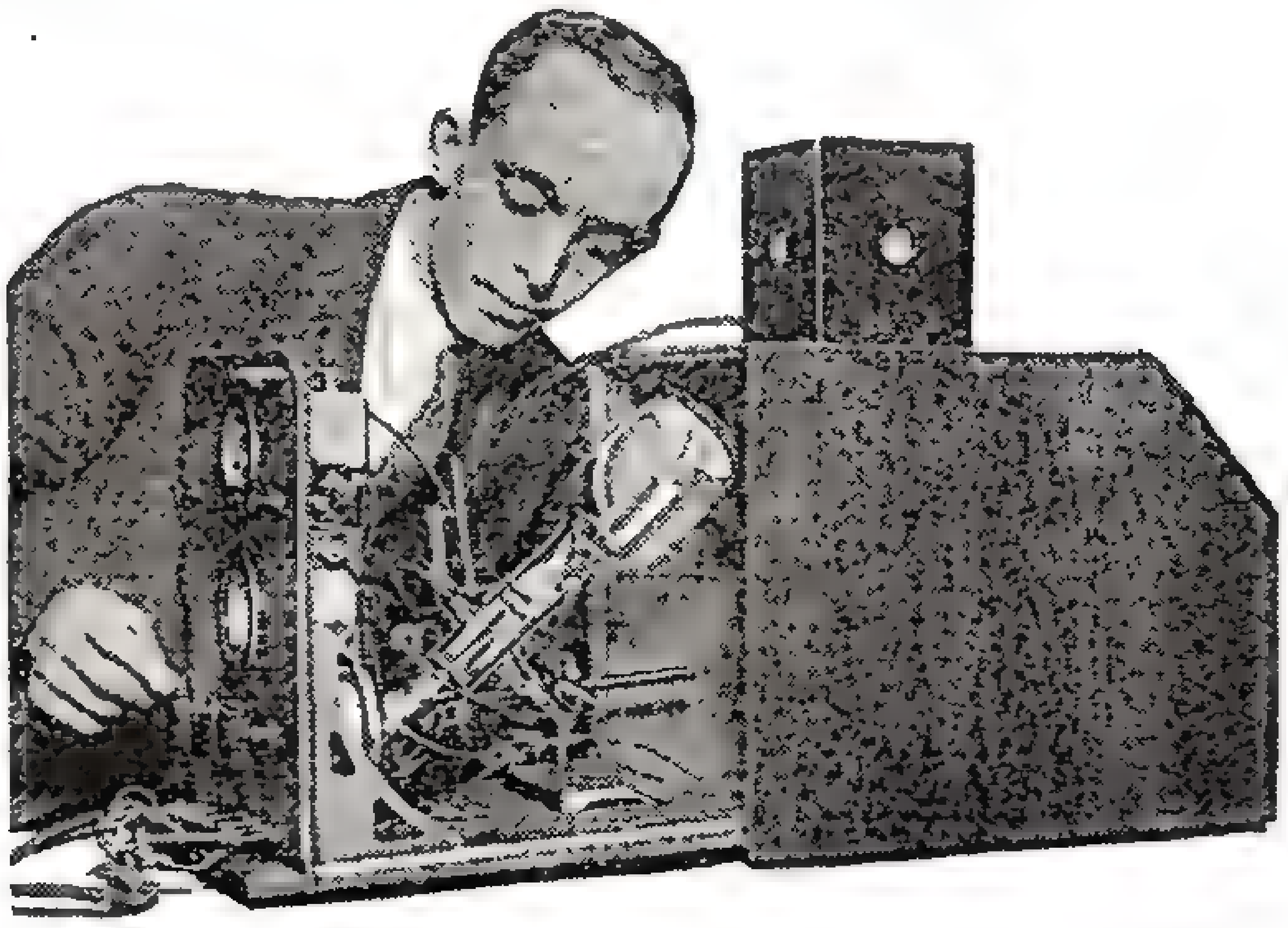
What attracts insects to certain fabrics and repels them from others is believed to be warmth. The lighter colors and shinier surfaces apparently impress the fly's tiny brain as being like sunlight.

Fog Compass Cuts Navigation Peril

FOGS, one of the deadliest menaces of the sea, may no longer hold any terror for navigators, thanks to the development of a new type of compass which indicates the direction of an approaching vessel.

The heart of the compass is a cathode ray tube on whose screen plays a pencil of light pointing out the danger angle. No information is given, but the tube presumably operates in conjunction with a radio compass.

The apparatus fits into the cabinet shown below, only the meter panel and the screen of the cathode ray being exposed during the direction-finding procedure.



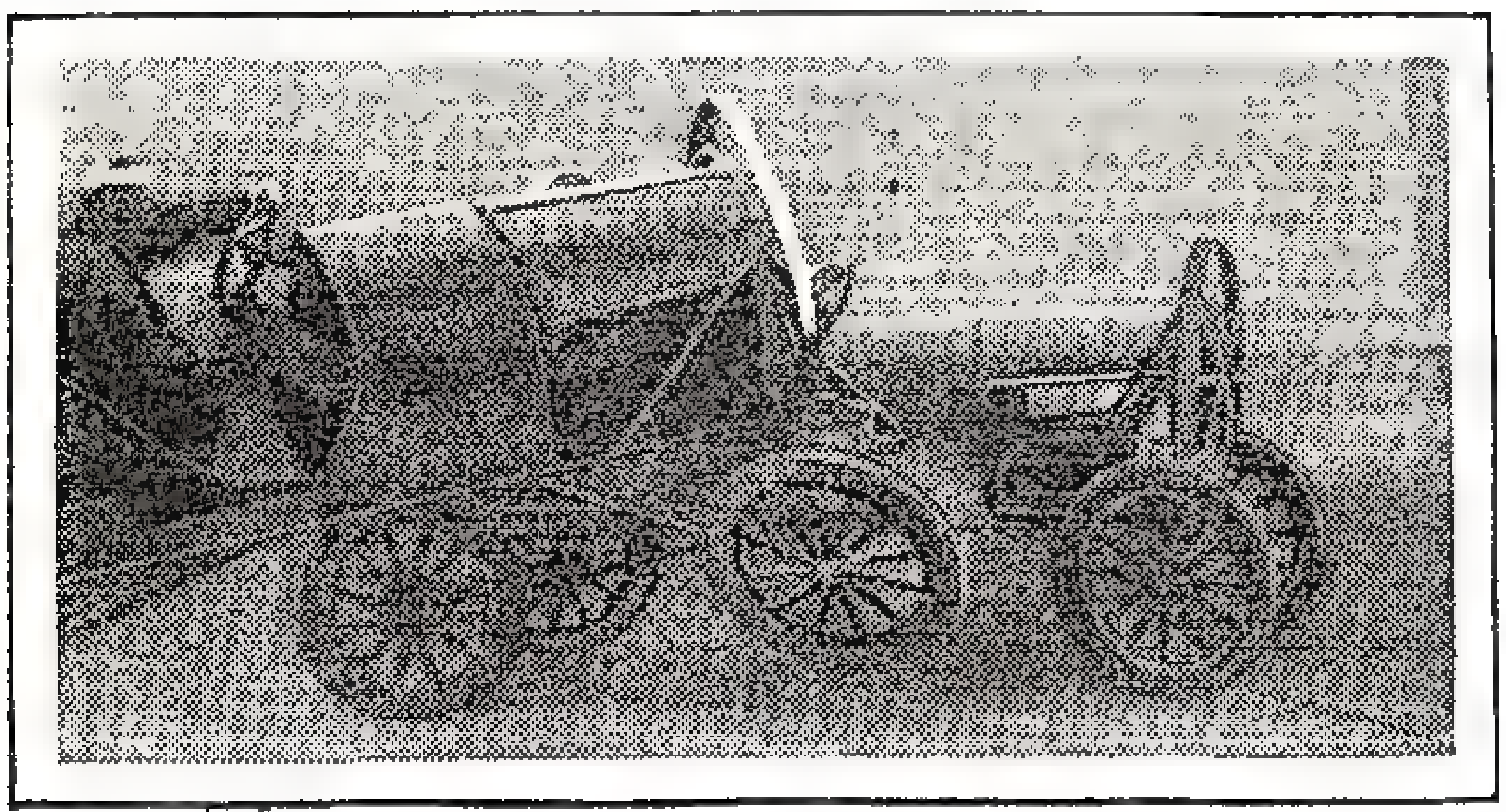
Pencil point of light on screen of cathode ray tube indicates direction of ship approaching in fog, eliminating hazards.

New THRILLS from Freak

by ED HARLAN GIBSON

SPILLS! Thrills! Smashups! Constant danger. Daredevil drivers strapped in odd looking, speeding cars, bouncing a huge ball about the race track.

Spills? Sure there's one! Dust clouds rise as a little car does a crashing "barrel-roll." Then another, farther up the track, fairly leaps into space as it turns over. The air about the grandstand has the tainted odor of burning rubber from spinning wheels—wheels spinning first back and then forward. Cars skid, slide about, swap ends like a wild bucking broncho.



Spectators at auto ball games are treated to all manner of freak accidents. Here a machine is seen climbing an opponent in furious clash.

Spills like this are common. Note how car rolls over on the sturdy hoop built onto stern and bow of the machine.

Another crash. A breath-taking spill. Wheels smash to splinters. For an instant the driver is hidden from the spectators' view.

The driver! He's killed? Smashed? No! There he is under the car, hanging in his safety belt with 1,600 pounds of iron and steel above him.

Those who are near can smell spilled gasoline. An oil spattered face smiles out at the spectators. Maybe he is bruised and injured, but still the driver smiles. It's a game he is playing and he loves the dangers it involves.

Game of Hairbreadth Escapes

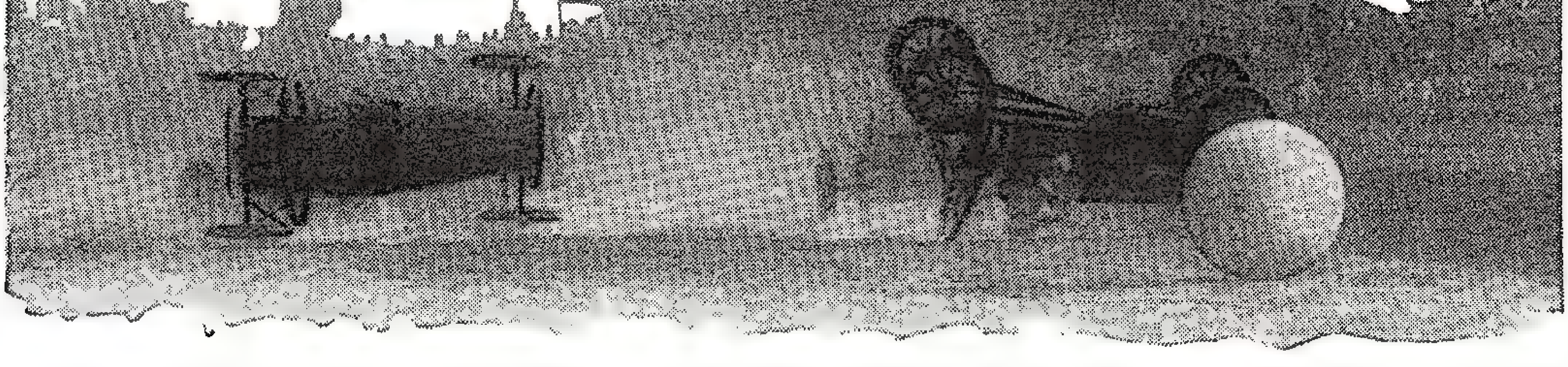
The roaring motor now above him is barking out a sharp, angry exhaust. The smell of gasoline becomes stronger. From his upside-down position the driver can watch the gasoline drip uncomfortably close to the red-hot manifold. Just a few drops landing directly upon it and instantly flames will be lapping at his feet, scorching his hands and face. In the nick of time attendants tip the car back upon its wheels.

The game goes on. More spills and hairbreadth escapes. Contenders fighting with cars for scores and, above all, aiming to give their spectators a thrill. A startling novelty; better than auto racing.

It is the Gibson troupe in action. The game is auto ball. The place? Any county or state fair that has contracted with the players to give their public a really thrilling attraction—a novelty that is different.

There are six specially built cars in the outfit. Four are used in each game, leaving two in reserve to use when wheels or other parts are broken. The object of the game is similar to that of football. One team endeavors to push the large ball through the opposite goal and, above all, to give the spectators unusual entertainment while doing so.

The ball used is also especially made. It is four feet high when in-



In the heat of the battle. Two machines pursuing the ball have just clashed, resulting in a spill for both. In the Auto Ball games, which are staged by intrepid drivers at country fairs, four cars specially built to withstand heavy punishment, take part, two machines being held on sidelines for emergency use. Object of the game is similar to football.

SPILLS of AUTO BALL

flated. Six plys of rubber and fabric are used in its construction which resembles that of an automobile tire. It weighs approximately seventy-five pounds. Many times these cars, weighing close to sixteen hundred pounds, are driven completely over the top of the ball without puncturing it. Again it is bounced ten to twenty feet into the air and well over the opponent's car. This is called a kickoff.

In the course of a game accidents are constantly expected and taken merely as a matter of course. The large ball, sailing through the air, has often caught a driver unawares, knocking him completely unconscious. Again, striking the steering wheel, the ball has smashed it between the hands of the driver.

Fire Most Deadly Menace

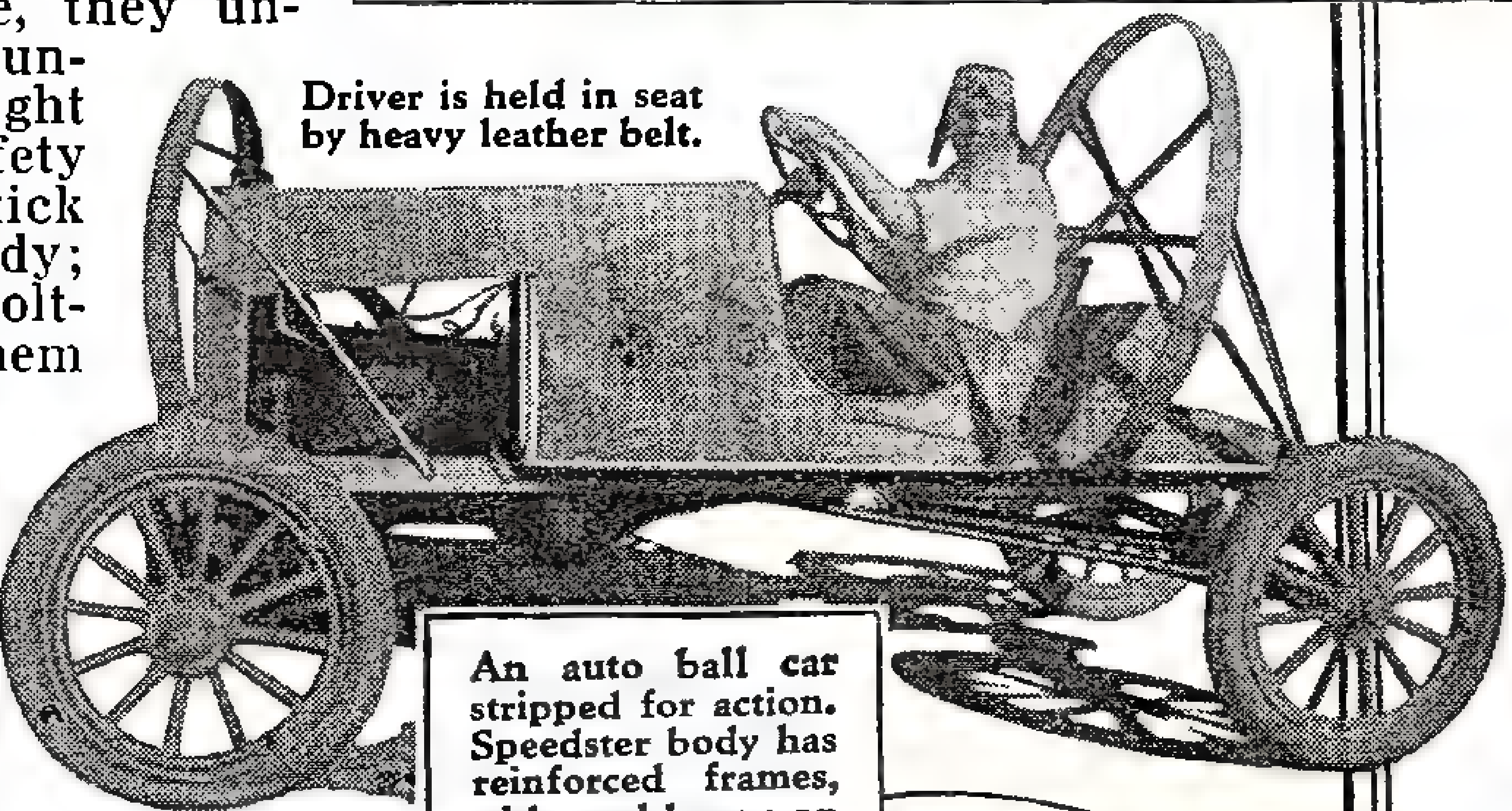
Fire is another hazard to contend with. Running wide open, the motors soon become red-hot. Then just a few drops of gasoline falling from the carburetor onto the red-hot manifold, while the car is upside down, will instantly ignite it. Breathless moments follow.

The attendant's first thought is of the driver. With flames already spreading about the oil-covered machine, they unstrap him. This he cannot do unassisted because of his weight hanging in the belt. Airplane safety belts have been tried. The quick way of hooking them was handy; too handy, for the jarring and jolting of the body unhooked them during the game.

Fire in a night game is a spectacular sight and women in the grandstand have even fainted watching the flames enveloping the car. Thus far the driver has been removed invariably unharmed in all cases.

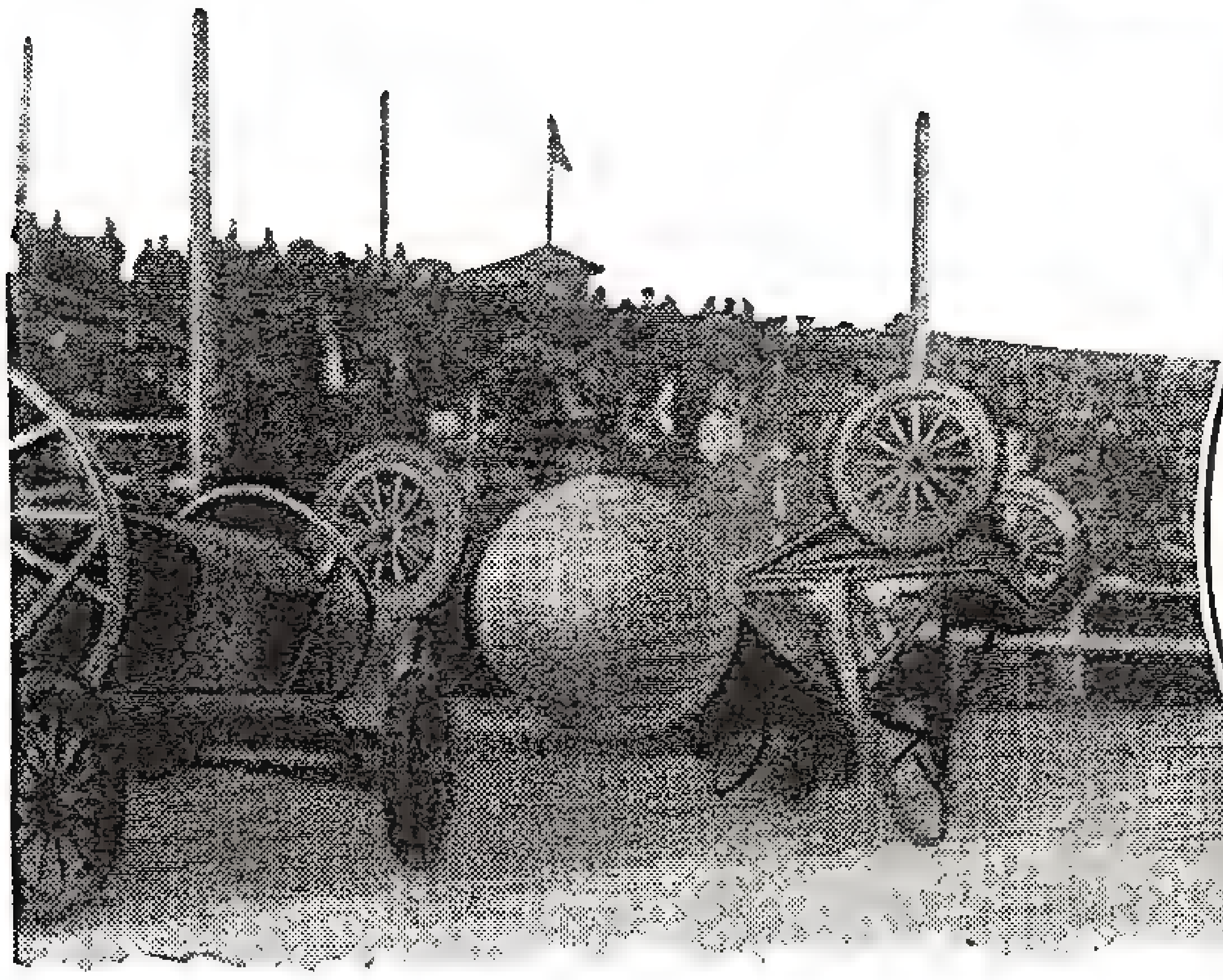
Experience has taught the drivers the knack of keeping their motors running in all positions, be it upside down or how. These drivers in auto ball claim a record of their own for spills, which in sport parlance means the complete overturning of the cars. In a short game of five minutes of play as many as fifteen spills have been made.

This is action in the raw. The grandstand reaction is deafening applause as only a thrill loving satisfied crowd can give.

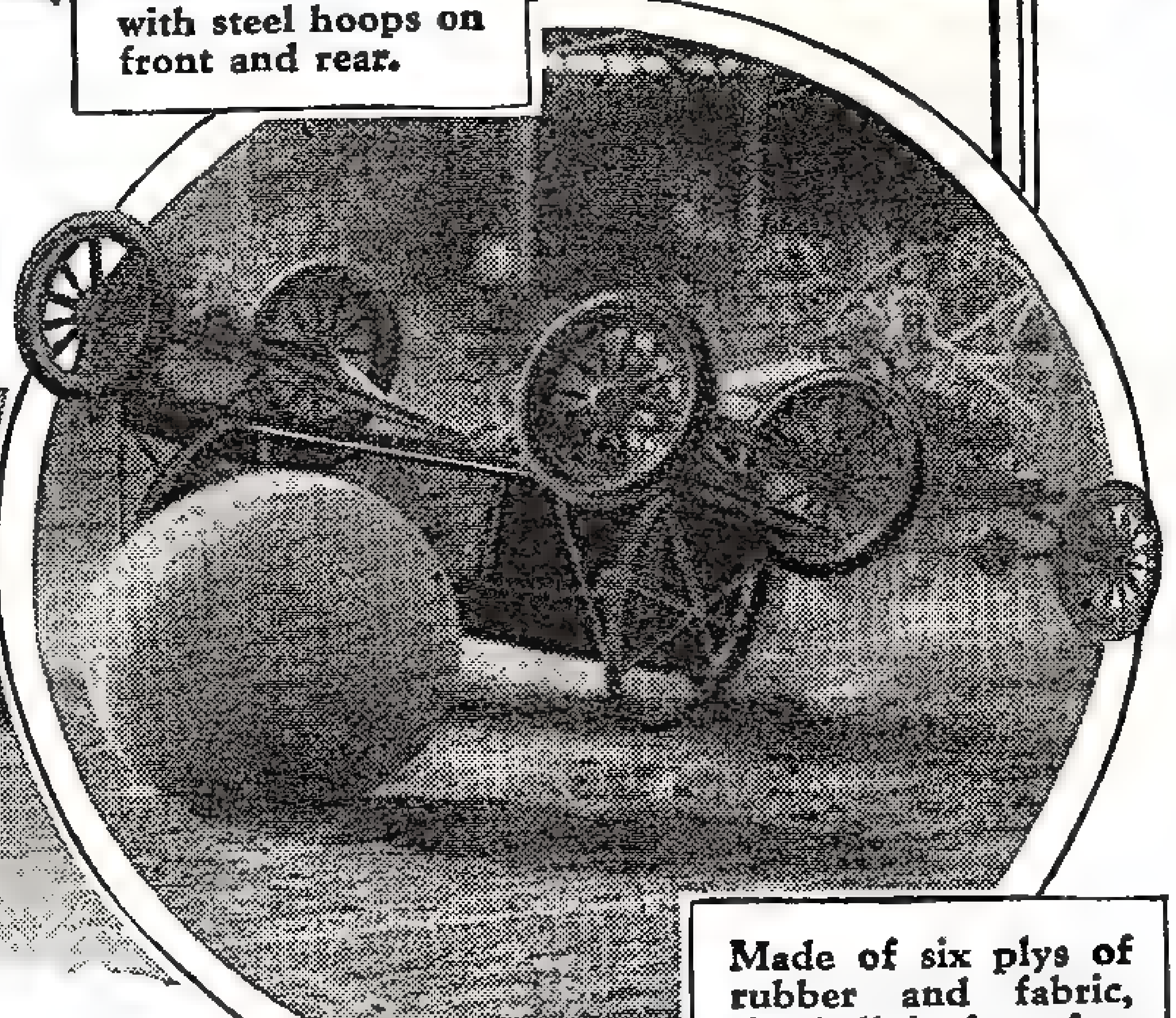


Driver is held in seat by heavy leather belt.

An auto ball car stripped for action. Speedster body has reinforced frames, with steel hoops on front and rear.



Typical action shot here shows one contestant doing a "barrel roll," while opponent maneuvers into position to give the ball a sock towards his goal. When in upside down position, driver's life is greatly endangered by gas dripping on overheated manifold. The motor is kept running always.

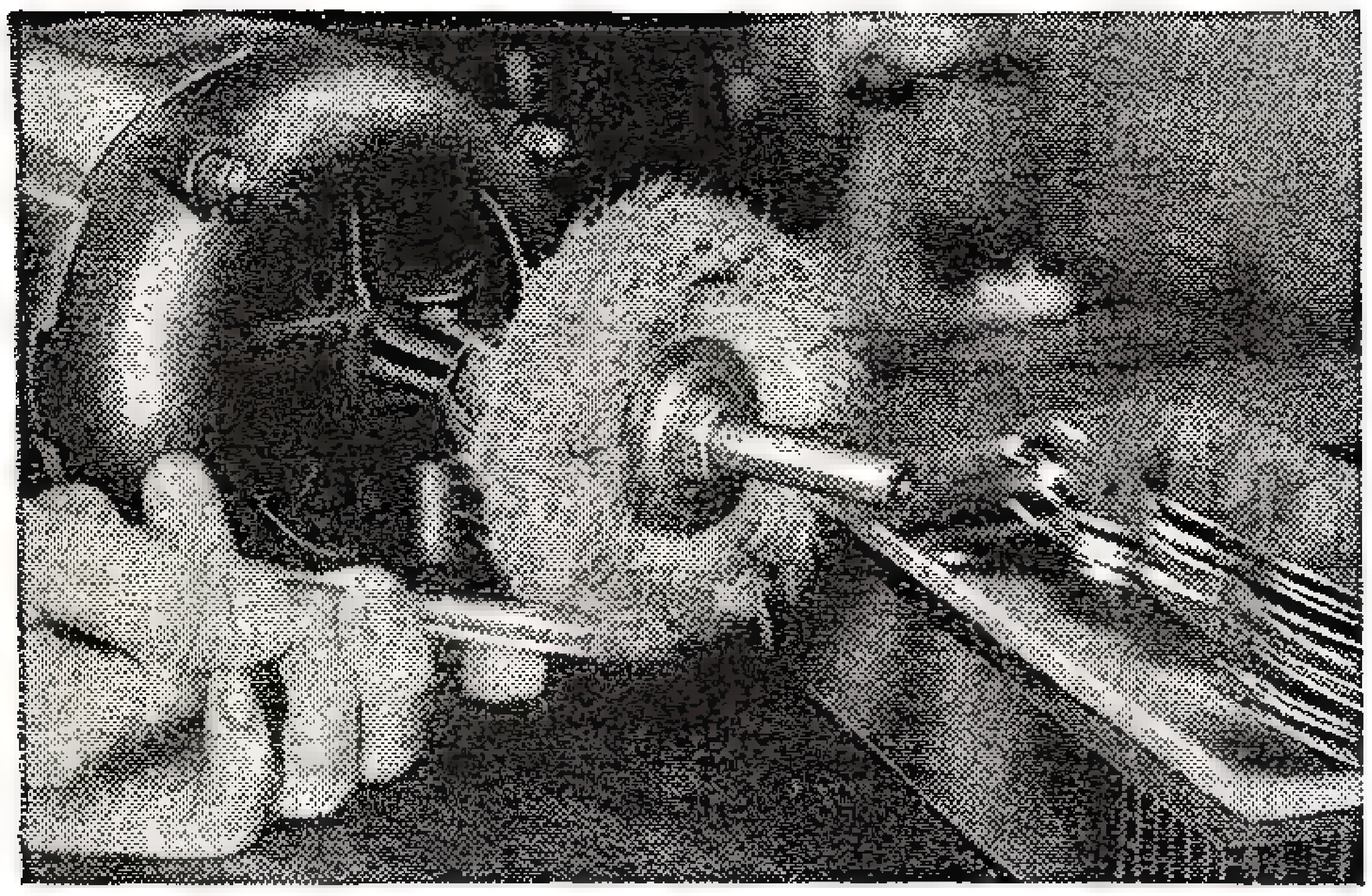


Made of six plys of rubber and fabric, the ball is four feet in diameter, weighing 75 pounds inflated.

1000 WAYS to MAKE a

Silverware Rebuffing

Regardless of how careful the housewife is, her silverware will gradually become scratched. The fellow in the neighborhood with a small buffing outfit and a stick of plater's rouge can be of great help and earn himself a dollar or two at the same time. Such ware does not need to be re-plated. As a matter of fact, re-plating will not remove the scratches—only buffing will do that. One man who makes upwards of $5 a day in this way, solicits business on a piecework basis, charging three cents each for knives and forks, more for pitchers and plates. He finds that much of his business comes from word of mouth advertising of those pleased with his work.



The only way to restore scratched silverware to new condition is to re-buff it with the equipment shown above.

Empty Store Windows

A young Canadian is making a nice living out of empty stores! He lives in a suburban district of some 100 stores, a dozen or more of which are vacant. He acts as agent for the rental of those vacant store windows, finding that the landlords are invariably glad to accept any small sum in the way of revenue. Users of billboard space are good prospects for the rental of windows for displays; public utility companies, tobacco manufacturers, and owners of adjacent stores who wish to extend their display space, are also good customers. The young man keeps the windows clean, charging a monthly rental, and picks up additional income from setting up displays and doing the window trimming.

Conducting a Doll "Hospital"

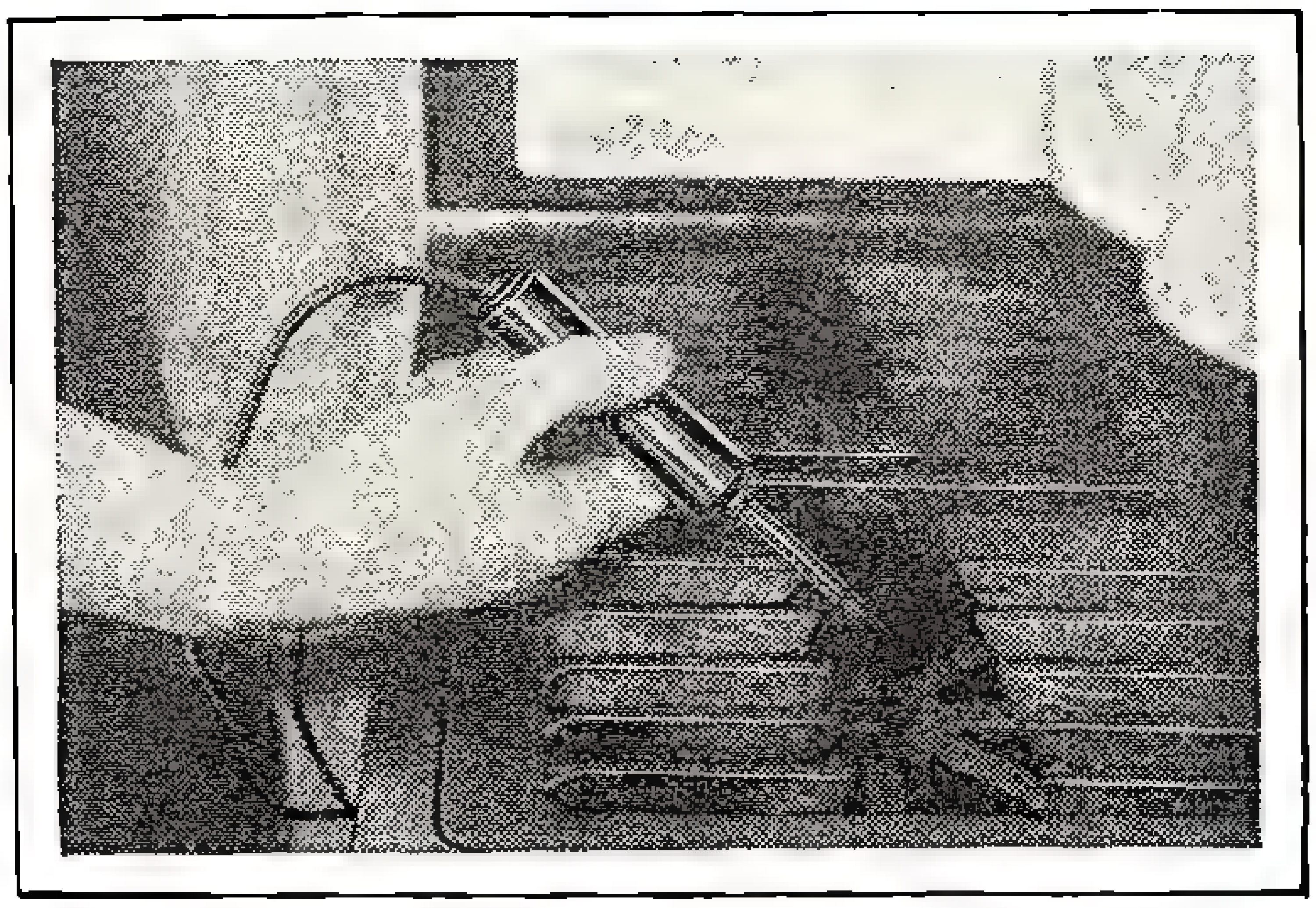
For more than seven years an elderly woman has kept young and made a living as a specialist in repairing worn or broken dolls. Such handicraft as might be used in mending pottery, painting china, arranging hair and sewing dresses makes up the unique qualification of the doll doctor. Charges are based on the time and material required on each "case." The testimony of a customer that "our doll means more to my little girl than you could imagine" reminds one that business built on simple sentiment is none the less real business. One factor that makes many sales is that the human hair of any member of a family can be made into a doll wig and thus kept as a souvenir of sentiment. The doll hospital is also an agency for the sale of new dolls.

New Income for Radio Men

Thousands of readers of this magazine are rather proficient in radio and could very well profit by the experience of a young Buffalo, N. Y. repairman who, with things so quiet recently, got several big contracts from the larger music teachers of the town. He thought it would be a fine idea if he sold those teachers of voice culture a recording outfit so that their pupils could correct their mistakes by listening to their own voices. After each lesson the pupil could sing a number that would be recorded and then take the small, inexpensive record home to let the family hear it. Other teachers flocked to have similar systems installed and several thousand dollars worth of business was developed within a few months. It was the type of installation that could be handled by any good radio experimenter.

Electric Gas Stove Lighters

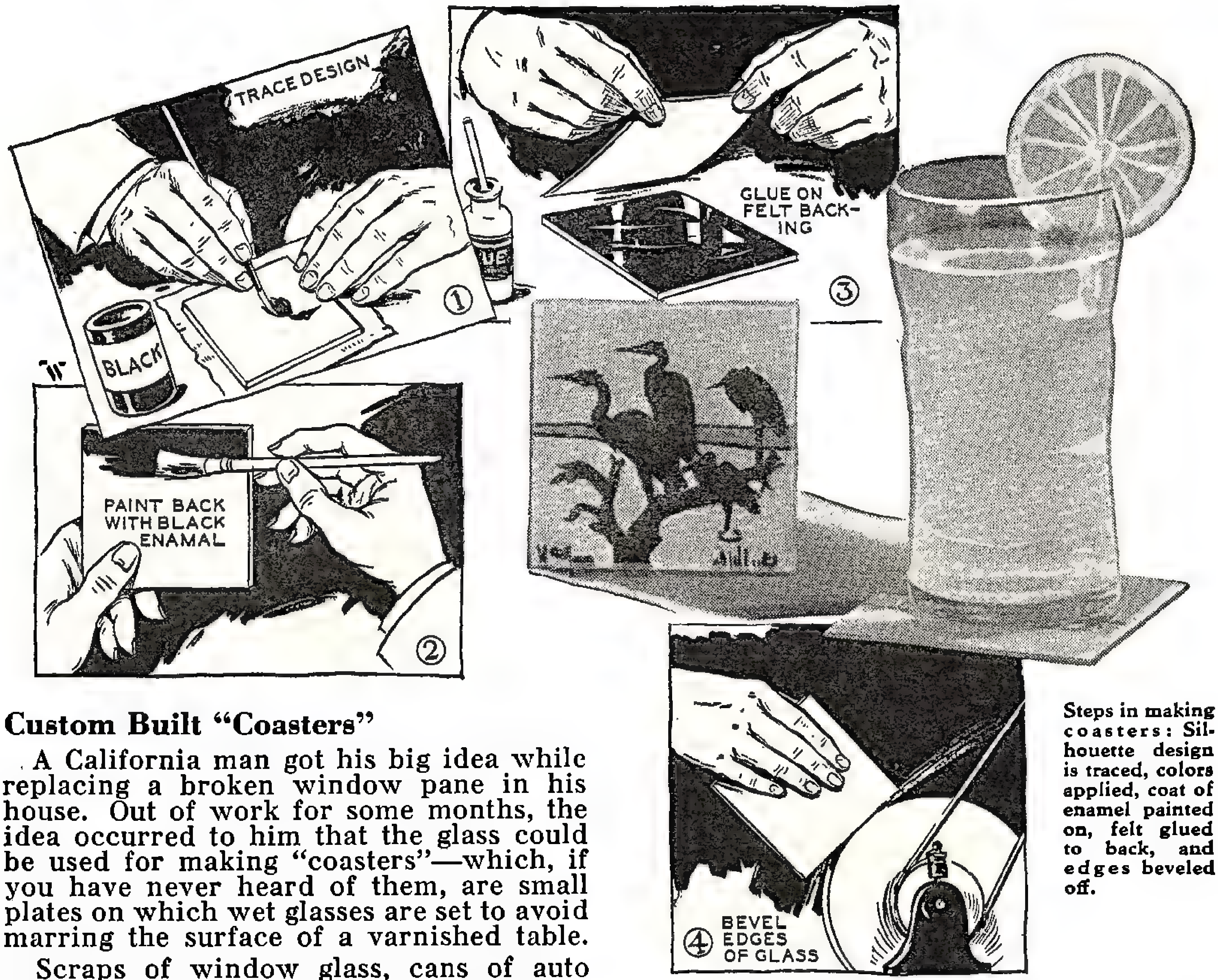
If a chap wants to go to some of the automobile junk yards today he will find that he will be able to buy all of the old Ford ignition coils that he can carry home for ten cents apiece. With two dry cells (of the small type that may now be purchased in the chain stores for ten cents apiece) these old coils make an excellent source of high potential for lighting gas stoves. The only other thing that is needed is a high potential electrode that can easily be made in the home shop. We still have in use many thousands of gas stoves that have to be lighted by matches and each user of such a stove is a good prospect for such an installation that may be made very profitably for about two dollars.



An electric gas stove lighter, operated by Ford ignition coil and dry cells, is welcomed by many housewives.

LIVING

Continuing the presentation of a series of articles on money-making ideas which have been proved out in practice.



Steps in making coasters: Silhouette design is traced, colors applied, coat of enamel painted on, felt glued to back, and edges beveled off.

Custom Built "Coasters"

A California man got his big idea while replacing a broken window pane in his house. Out of work for some months, the idea occurred to him that the glass could be used for making "coasters"—which, if you have never heard of them, are small plates on which wet glasses are set to avoid marring the surface of a varnished table.

Scraps of window glass, cans of auto enamel, a glass cutter, brushes, sand stone and felt are all the equipment required. The steps of manufacture are well shown in the illustration above. Any magazine drawing which lends itself well to silhouette can be used. The outline is painted in black enamel, and after it is dry colored backgrounds painted over it. Felt or velvet is then glued to the base to prevent scratching furniture, and the edges of the glass beveled off on a small grinding wheel. The originator of this idea finds that he can secure enough orders in one day's solicitation to keep his factory busy for a week. Glass can be salvaged from broken panes.

Neighborhood Small Stock Butcher

An unemployed man, seeking to "earn his eats" by odd jobs around produce markets and grocery stores, discovered the need for a small stock butcher at these places. The dealers, preoccupied by the many details of the day's business, are glad to turn over the task of dressing poultry and rabbits to this man. With only slight experience on farm and game fields he soon became rapid and skillful in dressing these meats to the satisfaction of the customers. The larger part of the difference in price between live stock purchases and dressed meat purchases goes to him as his fee. There are two side-lines to this job that bring additional profits: making quick deliveries for the dealers, and killing and dressing poultry for housewives who find such a task far from their liking. Now the new specialty butcher serves three dealers; he is pulling through the dark days with a moderate livelihood and he is laying the foundation for his own poultry and rabbit market that he has planned to start.

Spring Housecleaning Opportunities

With the spring season for housecleaning under way, the man who has a few pieces of household equipment which he can throw into his car will find his services welcomed by many housewives. A vacuum cleaner with attachments for cleaning mattresses, mouldings and baseboards, a carpet beater to accommodate the woman who still prefers to have her rugs taken outdoors and beaten, a chamois and window cleaning materials, floor waxer and polisher and a good furniture polish, will bring many an hour's work.

Tumblers From Bottles

Old bottles accumulate around every home in such quantities as to become a nuisance. Seizing upon this fact, a couple of enterprising men set up in partnership in the business of custom-building old bottles into fancy tumblers with monograms or other designs etched into them. Their success is attested to by the above photo, which shows the outfit set up in a store window. The customer supplies the bottles, usually of colored glass, and of uniform size. The partners cut off the bottle neck and smooth down the edge with a grinder. Etching is done either by a sandblast method or by the use of hydrofluoric acid. Fancy prices are obtained with ease, the usual charge being $4.50 for a half dozen tumblers.

Bird House Reproductions

When a Springfield, Ill., sign painter was hit by the depression, he turned to constructing bird houses, featuring a wren house which was a miniature of Abraham Lincoln's Springfield home. It found a ready sale locally and elsewhere. The same idea can be carried out in any community, using well-known local buildings.

Paint Brush and Paper

From Texas comes this suggestion, proved out by a man fairly handy with a show card brush: He bought a quantity of paper scrap trimmings from a printing office and made up a few sample signs, such as "Sugar—10 lbs. 55 cents," etc., suitable for display in the front window of a grocery. He sold six grocers on the idea of using his signs for giving their windows a gala look on sale days. Part of his payment he takes in groceries, the rest in cash. Materials cost practically nothing, so his income is mostly net profit.

For the Fishing Season

A youth fond of fishing had difficulty finding worms just when he wanted them on hot summer days. So, when doing spring spading in his garden, he buried a large size tub in a corner and every time he turned up a worm tossed it into the tub, along with some dirt. He mixed cotton seed hulls and coffee grounds with the dirt and kept the layout damp with water and burlap sacks spread over the top for shade. His worms grew up to 12 inches long and ⅜-inch in diameter, finding a ready sale to other fishermen at from one to three cents each, depending on size.

Fly Paper Advertising

Make up samples first and take orders from merchants for sticky fly paper with their advertisement printed on the sheets and showing through the "stickem." This especially appeals to merchants as a medium for advertising spring and summer specials, since it serves a useful purpose and will last much longer than a handbill. Four dollars a hundred, including distribution by boys, is the charge established by a Michigan man who has found this idea a good source of revenue. Use manila paper, have the ad printed *first,* then apply the following sticky formula with a brush:

12 oz. boiled linseed oil
1 oz. resin   1 oz. castor oil

New Slant on Chicken Money

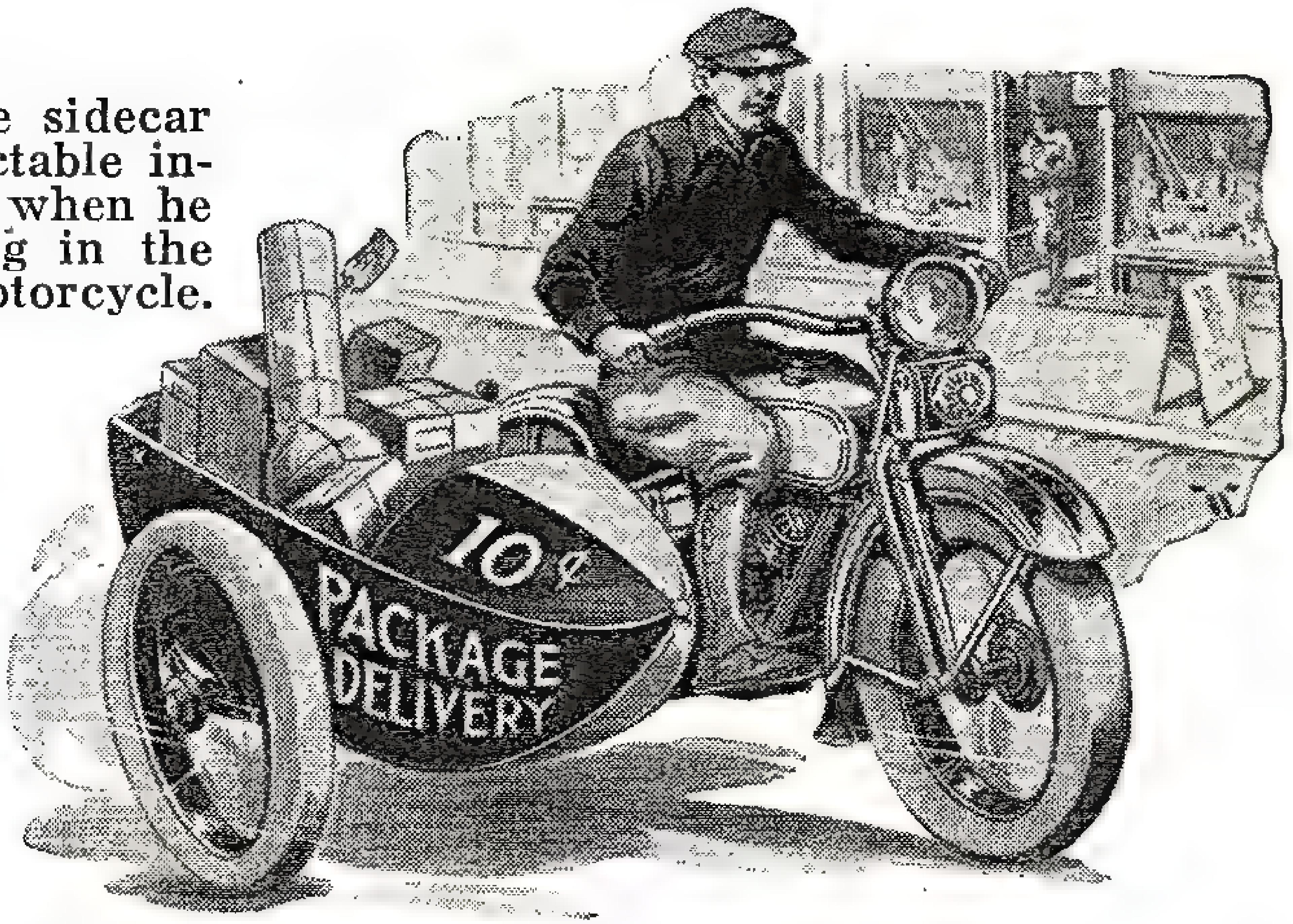
Chicken raising is a large industry in California and other parts. A truck driver for a feed distributing company was about to be laid off because of slackening business, so he figured out a scheme to boost feed sales which won him a raise in salary and a better job. The feed company supplies a certain number of its customers with 2,000 baby chicks each. Feed for them must be bought from the company. When the chicks are six weeks old, the customers return half the roosters (some 500 chicks) to the company, which feeds them for two weeks longer and disposes of them for 50 cents apiece, bringing back about double the original investment in chicks at six cents each, as well as the sale of feed. At the end of two years, when stock is customarily replaced, half the old hens come to the company for additional profit. An allowance of about 10% for death of chicks should be made.

Catalog Distributor

Twice a year the large mail order companies distribute a tremendous number of catalogs, especially in rural communities. One resident of an Ohio town who had lost his job wrote in to a large company and offered to make a personal distribution of their catalogs in his community at a considerable saving over the cost by mail. They shipped the catalogs to him and he distributed them to the mutual profit of himself and the company.

Motorcycle Delivery

Small parcels delivered in the sidecar of his motorcycle bring a respectable income to a youth in Illinois who, when he lost his job, had little remaining in the way of tangible assets but his motorcycle. Determined to make his machine return money to him, he gave the sidecar a fresh coat of point, stenciled a "10c Package Delivery" sign on it, and proceeded to sell his services to local merchants too small to have their own delivery trucks. Drugstores he found particularly interested in his delivery service. A small ad in the local newspaper (he lived in a small town where a journal was published weekly) helped to inform the public of his business.



Correct Time By Phone

Recently an unemployed man in New York devised a clever advertising scheme. He first had some small handbills printed, advertising the fact that anyone could obtain the correct time by telephone, at no cost, and without speaking a word. It was only necessary to dial his phone number and the correct time would be given after a small advertisement had been read. He hired several small boys to distribute these circulars throughout the town. He next sold advertising space to a number of local merchants at a weekly rate. As each subscriber called he read one of the advertisements, taken in rotation, and then stated the correct time. With the aid of his two daughters he was able to give 24-hour service by dividing the day into three 8-hour shifts. Thus he provided an indispensable service to telephone subscribers and an excellent medium of advertising for the merchants, as well as a substantial income for himself.

Small Town Newspapers

Nearly every small town now boasts a weekly newspaper and only the largest have a subscription solicitor employed regularly. Because they lack size their lists offer employment a few weeks only. The publishers feel it would be impossible to find a capable person for so short a job. By interviewing several of these publishers located far enough apart so their lists don't interlock you can arrange a schedule that will give you year-round work. Payment is usually by commission and is adequate. Publishers will be glad to give you pointers and often actual help, as you both gain. The publishers gain subscribers and you gain a living. You will, of course, take renewal subscriptions as well as new ones and if you make good and return to each territory year after year you will find the work intensely interesting.

CASH FOR MONEY-MAKING IDEAS!

Have you worked out some ingenious, practical way of making money, either as a full-time job or a spare time activity? Perhaps some friend or neighbor, thrown out of work, has used his wits to devise some money-making scheme which brings better returns than the job he lost—this very thing has happened so often recently that many men look on depression as a blessing in disguise. For all accounts used in this money-making department of the magazine, payment will be made at regular rates. Here's your chance to become an author! Keep your article brief, and address it to Modern Mechanix and Inventions, 529 S. Seventh Street, Minneapolis, Minn.

Aid to Stalled Motorists

A young fellow, handy around automobiles, bought a second hand motorcycle, a tool kit, and a can large enough to hold five gallons of gasoline. On Sundays and holidays he patrolled the thickly traveled highways around his town and encountered many motorists stalled with minor troubles. Since the motorists did not want to soil their clothes or did not know how to make their own repairs, they willingly paid rather high charges to the young man who brought service right to the spot, saving tow-car expense. He also made a neat profit on the sale of his gasoline to those whose tanks had run dry.

Saving Money for Gas Users

Discovering that by wrapping asbestos around the home hot water tank he could have boiling water at half the gas bill, an Ohio home owner has been making similar installations in neighboring houses through word of mouth advertising. Insulation also makes it entirely unnecessary to light the burner in the winter time in instances where pipes pass through the furnace. Any plumbing supply company will supply the raw materials for establishing a profitable business of this sort.

A Deal With Florists

A New England man, 65 years old, found it impossible to secure a job, but he hit upon the idea of furnishing florists with plants that grow wild in the woods. Florists demand such items for seasonal decoration. Pine and spruce cones bring him

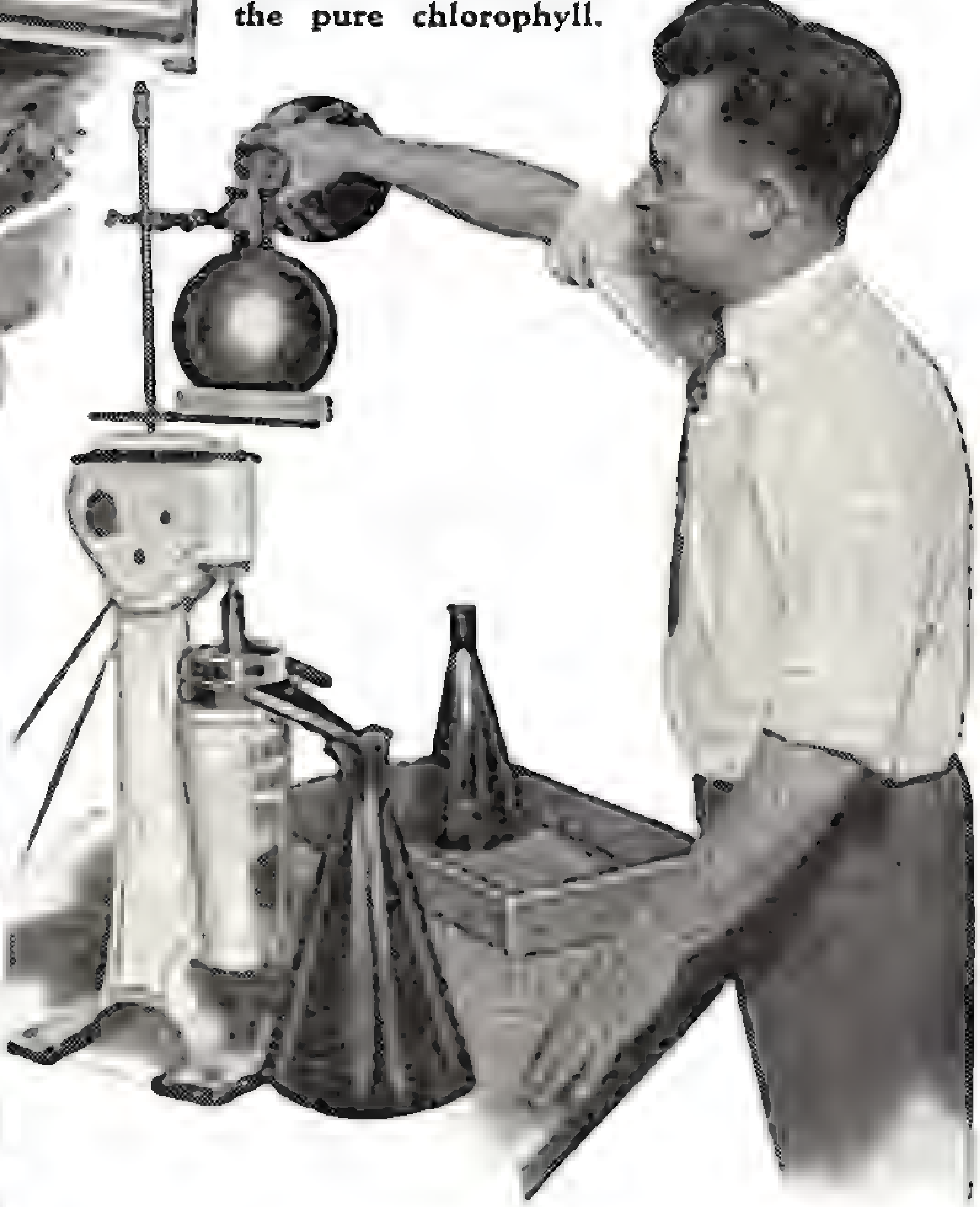
(Continued on last page)

Plants GROW "BLOOD"

First step in production of chlorophyll is drying of leaves in oven.

Three stages of chlorophyll production—the leaves, the powder and the pure chlorophyll.

Second step—Dried leaves are placed in "ball mill" and ground to powder by stones rolling around in interior of revolving drum. Mask guards lungs against dust from leaves.



Third step—Liquid chlorophyll is run through silver lined centrifuge to remove all impurities. Dr. Schertz, who has achieved prominence for his experiments, is pouring.

THE ancient sun worshippers, it now appears, had a theory of life, and its relationship to man, which has now been proven scientifically sound.

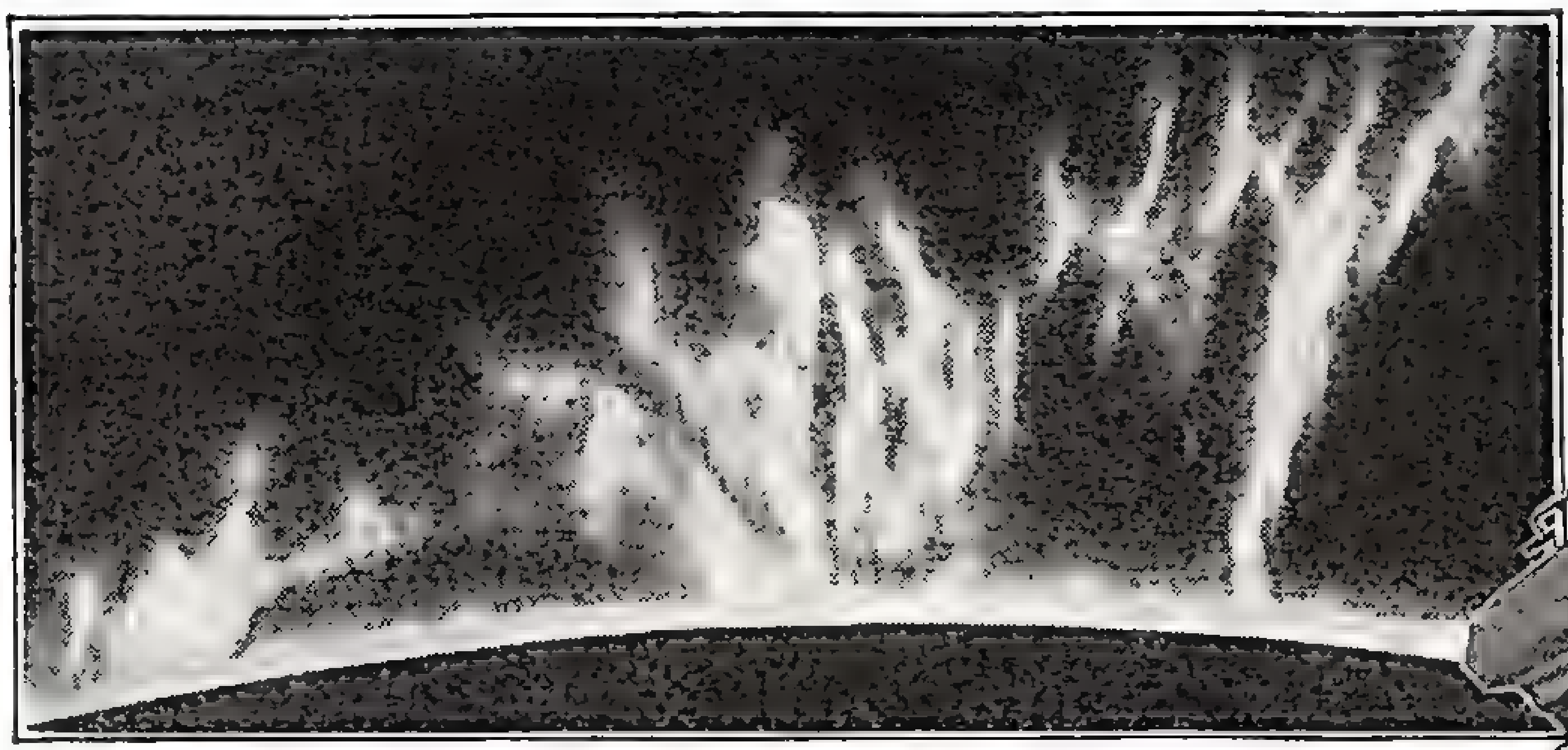
The chemists, biologists, physicians, have discovered that life comes from the sun. Furthermore, that plant life and human life are chemically related if not one and the same basic thing. Out of the laboratory of the organic chemist comes substances that show such a relationship.

Physicians have for many years been advising people to eat more green vegetables. "Old stuff!" you say? Yes, comparatively. But the green foods, such as lettuce leaves, spinach, kales and others, contain vitamins, needed by the human laboratory of the body.

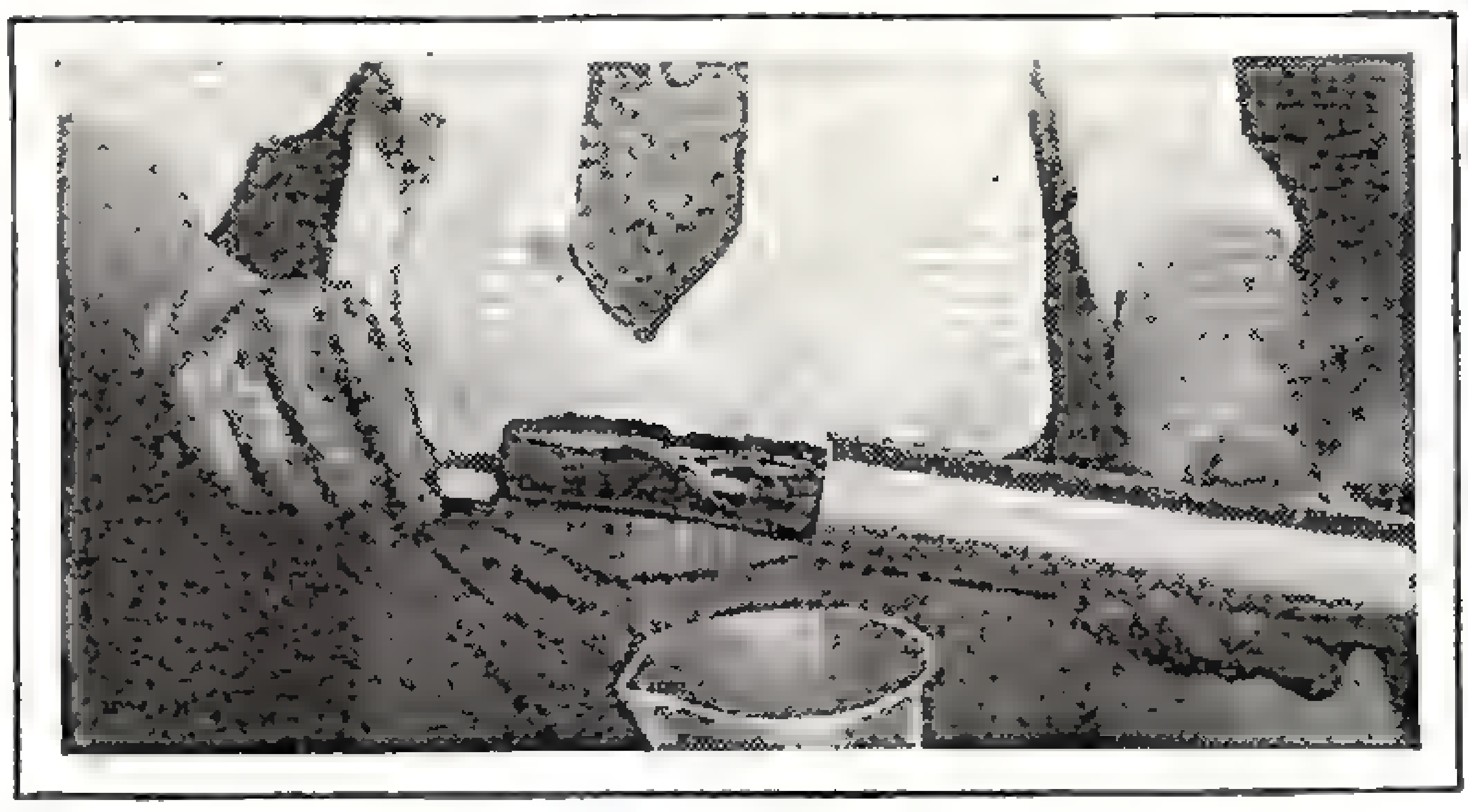
Blood and the green of the leaves (chlorophyll) are practically identical. Chlorophyll contains carbon, hydrogen, oxygen, nitrogen and magnesium. The only chemical difference in the organic construction of the chlorophyll in plants and haemoglobin in blood is that the former contains magnesium while the latter contains iron.

German chemists taking their chlorophyll product that they derived from the leaves of growing plants, made them into pills which they gave to patients in clinics and hospitals, keeping a minute medi-

for HUMAN HEALTH



Flaming surface of the sun, scientists believe, is source of the chlorophyll which colors plants and sustains life.



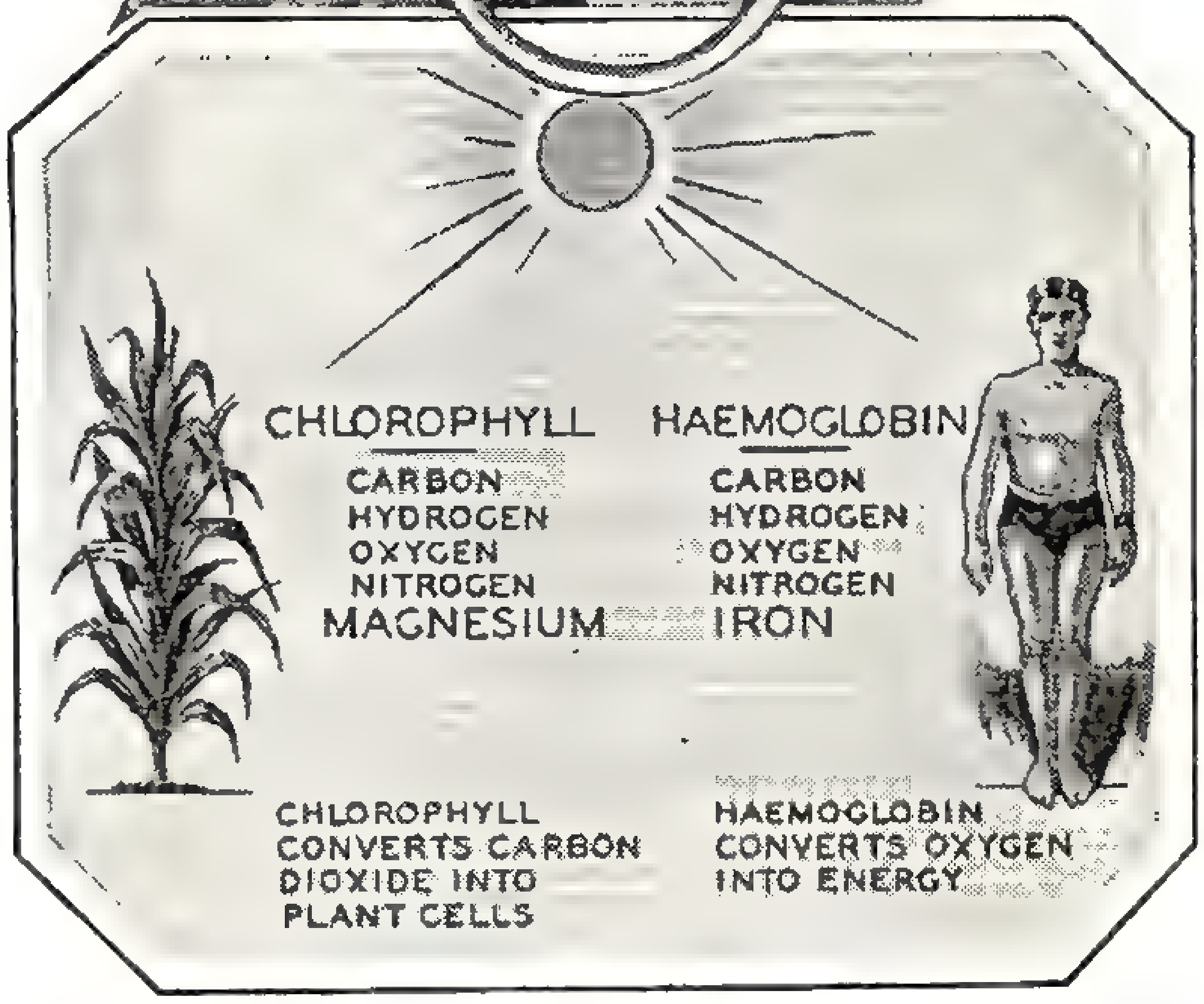
Here's a tube of pure chlorophyll, or "concentrated sunlight," extracted from a batch of leaves. At right scientist is seen measuring work performed (consumption of oxygen) by man sawing a board. Dosing with chlorophyll, tests showed, greatly increases energy production.

cal record of results. These pills, which may well be called "concentrated sunshine," produced amazing results. The facts, as recorded in the unemotional, matter-of-fact statements of the German scientists, would show that these chlorophyll pills reduced high blood pressure, eliminated anemia, made weak men strong, cured digestive troubles, and seemed to be in fact, a pill of youth.

Once in the digestive stream chlorophyll immediately enriches the blood. The red blood cells immediately increase in number while their haemoglobin content rises. (Hemin, of the blood, and chlorophyll, are practically identical.) The blood thus enriched and reinforced with new life is able to bring about amazing recoveries.

The eating of green foods is taking chlorophyll into the body's chemical laboratory, but the taking of a concentrated form is merely a short cut in giving the body a tremendous amount of it and the reaction is positive. The sunshine that the plant caught and benefited by is thus passed on in the form of blood-life for the human being.

Dr. Schertz, an eminent American chemist, suggests that chlorophyll gives us the clue as to just what life is. He has found a way to extract pure chlorophyll from plants easily and cheaply enough so that it can be used commercially, although he was not the first to isolate it.

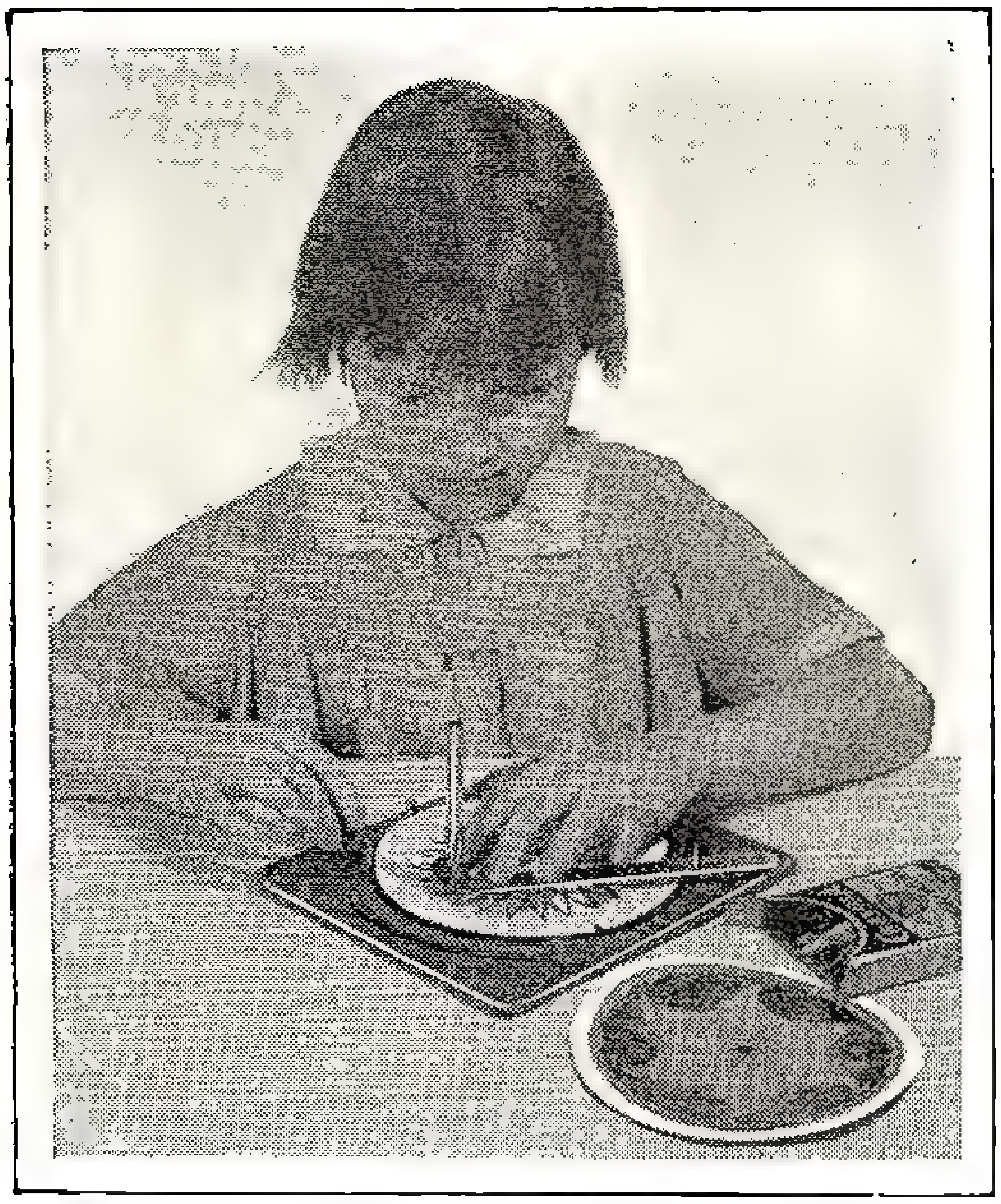

CHLOROPHYLL
CARBON
HYDROGEN
OXYGEN
NITROGEN
MAGNESIUM
HAEMOGLOBIN
CARBON
HYDROGEN
OXYGEN
NITROGEN
IRON
CHLOROPHYLL CONVERTS CARBON DIOXIDE INTO PLANT CELLS
HAEMOGLOBIN CONVERTS OXYGEN INTO ENERGY

Close relationship between green of plants (chlorophyll) and haemoglobin (blood) in human beings is seen in the chemical constituents of two life-giving substances. Note also similarity of the vital functions performed in organisms.

The humanly useful place of chlorophyll is explained as the one link of nature for the converting of energy into matter. The energy reaches the earth in the form of sunlight and cosmic rays. By some mysterious process this energy is transformed in the plant into matter. The chlorophyll plays the chief role.

(Continued on page 141)

"Hoot-nanny" Traces Million Designs by Turn of Crank



Millions of symmetrical designs can be traced on cardboard disk with this fascinating new toy, called a "Hoot-nanny." Designs may be colored with crayons provided with toy.

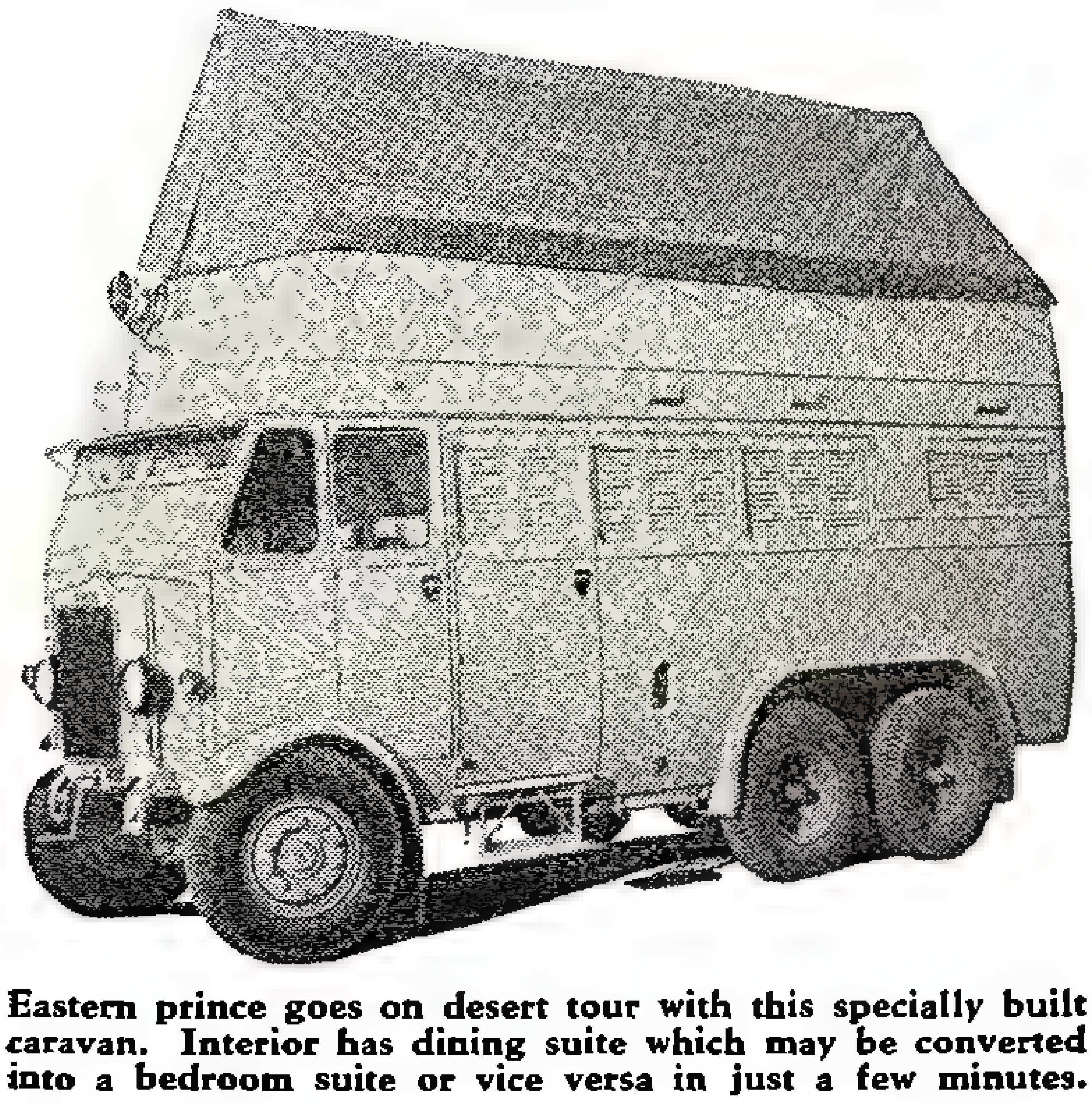
OF SPECIAL interest to children is a new sensational toy which forms millions of symmetrical designs on paper disks. No particular skill is required in operation. A pencil is inserted in the position shown in the photo and a crank turned, whereupon the designs are traced with amazing accuracy. The designs can be colored with crayons that come with the toy.

Just why, we don't know, but the toy has been given the unique name of "Hoot-nanny" by the manufacturers.

How Modern Prince Tours Desert

A DOUBLE deck caravan built on the lines of an open top bus, but otherwise of striking design, has recently been constructed by the British Leyland Company for use by an Eastern Prince, H. H. Abbas Himli II, when he goes on desert tours.

Shown below, the caravan has three lower deck compartments equipped with armchairs and settees which can be converted into a dining table or a complete bedroom suite, servants are accommodated on the upper deck where there are four cots and a tent roof.



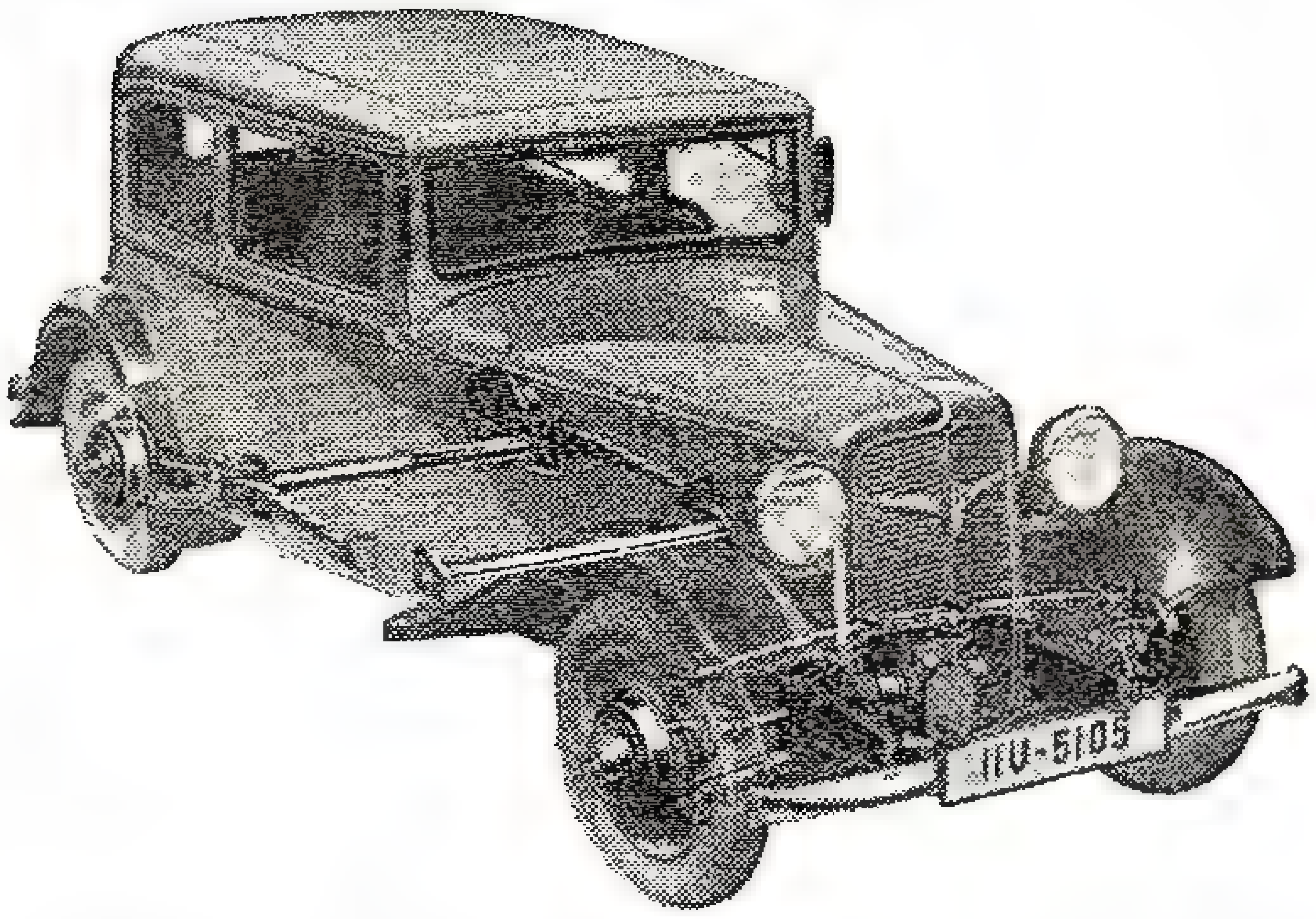
Eastern prince goes on desert tour with this specially built caravan. Interior has dining suite which may be converted into a bedroom suite or vice versa in just a few minutes.

Car Wheels Have Separate Motors

GERMAN automotive engineers have come out with a car which merits especial attention because of its unusual frontwheel drive. Each front wheel runs on its own axle and is powered by an individual motor. Far greater flexibility is thus provided especially on rough ground.

Another great advantage to this type of construction, engineers claim, is that a lower center of gravity is permitted, giving the car increased stability, speed, and an improved general appearance.

A clear idea of the construction of the bus will be gained from close inspection of the phantom view of the body below.



Phantom view of new German auto shows wheels powered by individual motors, an arrangement which improves flexibility of the machine and permits a lower center of gravity.

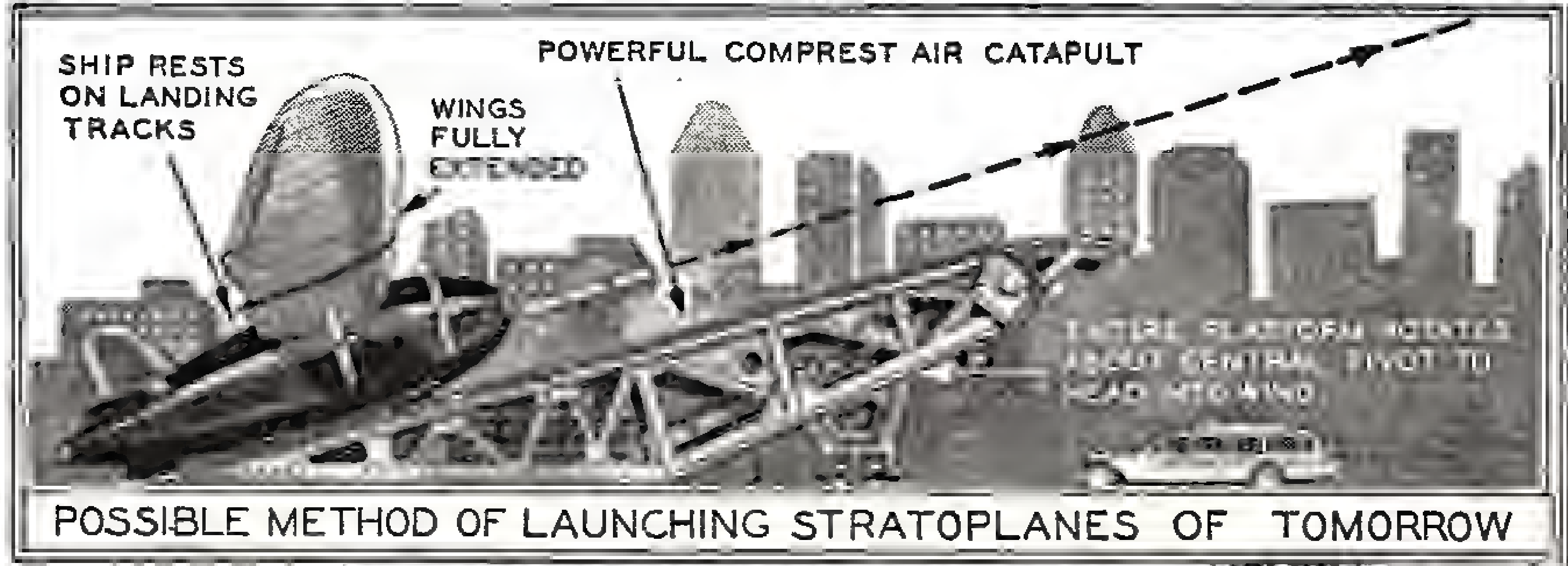
Six Reasons Why You Get Sick

THAT medical science knows only six distinct causes of illness, was asserted in a recent lecture by an eminent English surgeon. One is injury, such as backache from a sprain or ill health as result of a wound. A second is malformation of some part of the body, such as a hunchback or some other deformity at birth.

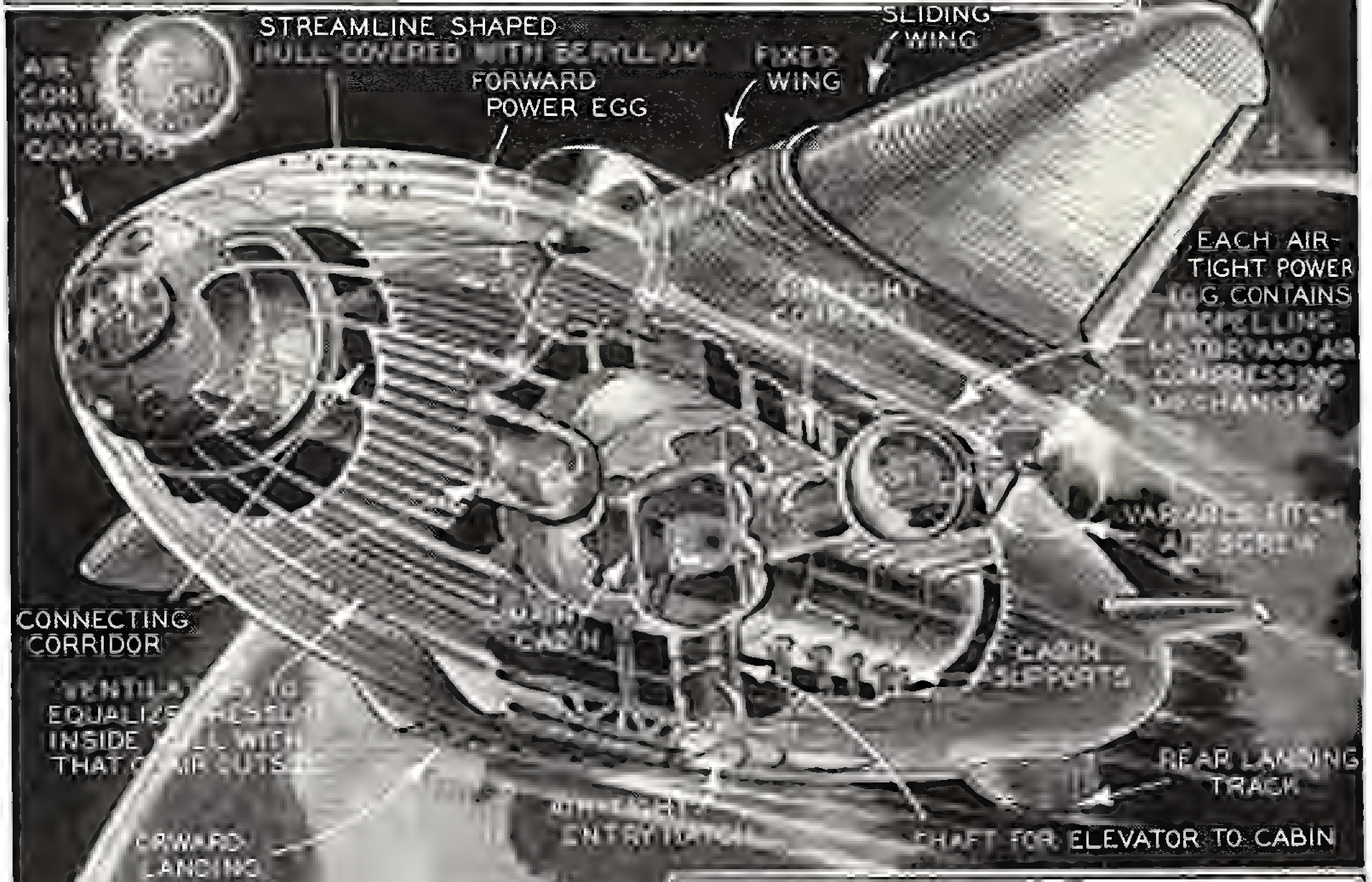
Third is a defect of diet, causing scurvy, rickets or other such disease of malnutrition. Fourth is poisoning, including lead and carbon monoxide poisons. Fifth is infection by parasites, including the large number of diseases caused by germs. Sixth and last are what physicians call "neoplasms," including cancer and other malignant growths.

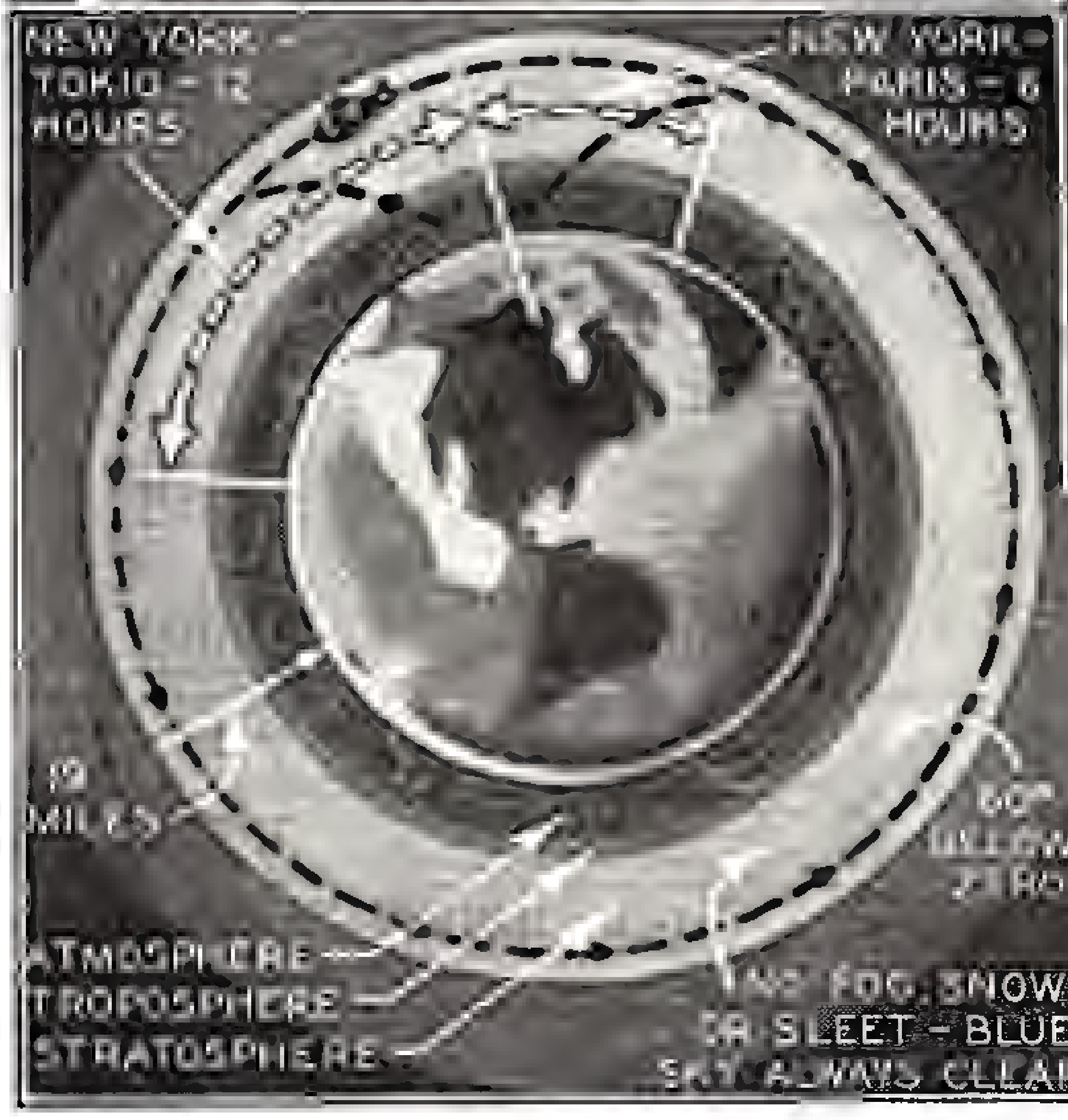
Four most serious causes are injury, bad diet, poisoning and parasites.

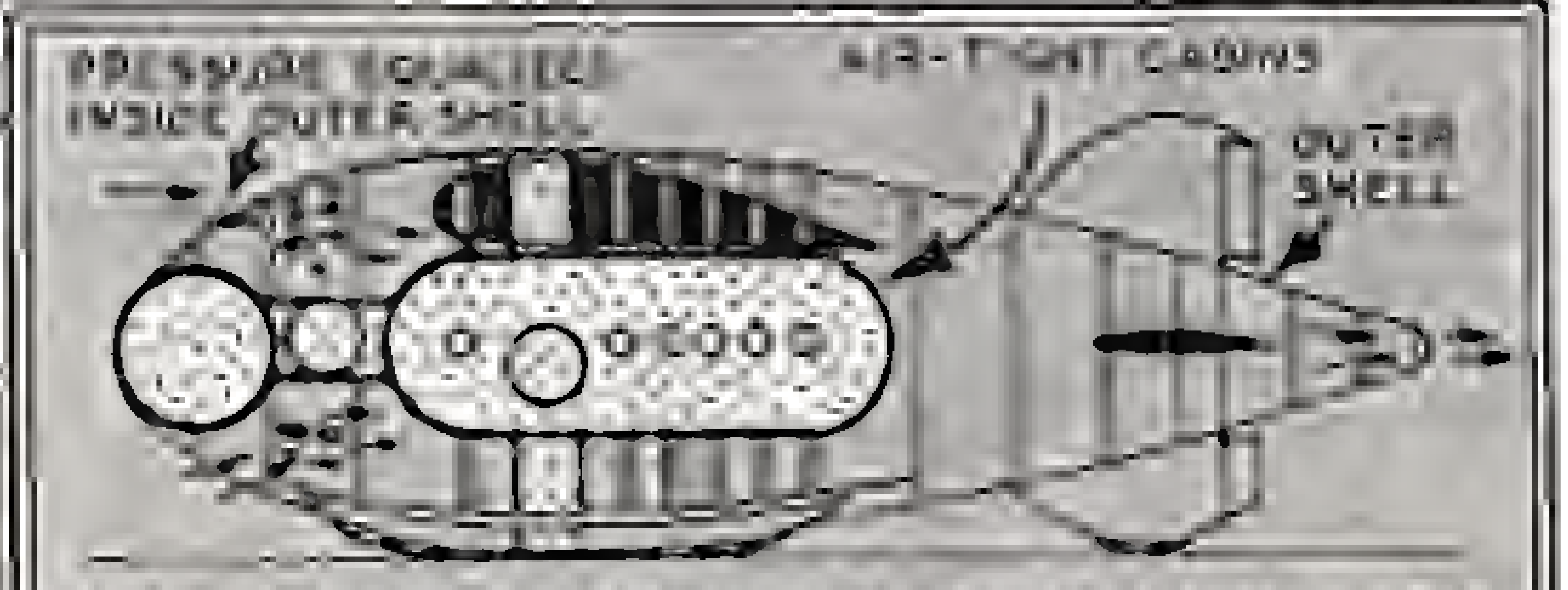
Six Hours to Europe in Stratosphere Liner


SHIP RESTS ON LANDING TRACKS
POWERFUL COMPREST AIR CATAPULT
WINGS FULLY EXTENDED
ENTIRE PLATFORM ROTATES ABOUT CENTRAL PIVOT TO HEAD INTO WIND

POSSIBLE METHOD OF LAUNCHING STRATOPLANES OF TOMORROW


AT FULL SPEED ABOUT 500 MILES AN HOUR WINGS ARE FULLY RETRACTED
STREAMLINE SHAPED HULL COVERED WITH BERYLLIUM
AIR CONTROL AND NAVIGATING QUARTERS
FORWARD POWER EGG
FIXED WING
SLIDING WING
EACH AIR-TIGHT POWER EGG CONTAINS PROPELLING MOTOR AND AIR COMPRESSING MECHANISM
VARIABLE PITCH AIR SCREW
CONNECTING CORRIDOR
MAIN CABIN
CABIN SUPPORTS
VENTILATORS TO EQUALIZE PRESSURE INSIDE HULL WITH THAT OF AIR OUTSIDE
REAR LANDING TRACK
FORWARD LANDING TRACKS
SHAFT FOR ELEVATOR TO CABIN


NEW YORK - TOKIO - 12 HOURS
NEW YORK - PARIS - 6 HOURS
19 MILES
60° BELOW ZERO
ATMOSPHERE
TROPOSPHERE
STRATOSPHERE
NO FOG, SNOW OR SLEET - BLUE SKY ALWAYS CLEAR


PRESSURE EQUALIZED INSIDE OUTER SHELL
AIR-TIGHT CABINS
OUTER SHELL

COMPREST AIR FROM SUPERCHARGERS ENSURES NORMAL AIR CONDITIONS IN CABINS OF SHIP

Traveling three times faster and with greater safety than planes operating in the ordinary air lanes, great air liners of tomorrow will drone through the purple darkness of the stratosphere to connect the principal cities of the world in the space of a few hours, is amazing prediction of Prof. Piccard, conqueror of the upper atmosphere. The greatest obstacles to be overcome, protection against extreme cold, low atmospheric pressure, and the dangerous sun's rays, will likely be conquered by a plane having the features of the ship illustrated in the artist's drawing above. Time between Paris and New York City may be reduced to less than six hours, when the stratosphere plane materializes. The method of launching the stratoliner shown above is a new development, made necessary by take-off difficulties incident to the design of a ship intended exclusively for cruising in thin atmosphere.

Whole Cigarette Factory Contained in Single Tobacco Can

Press a lever, out pops a cigarette, rolled, ready for lighting with matches contained on side of this tobacco can.

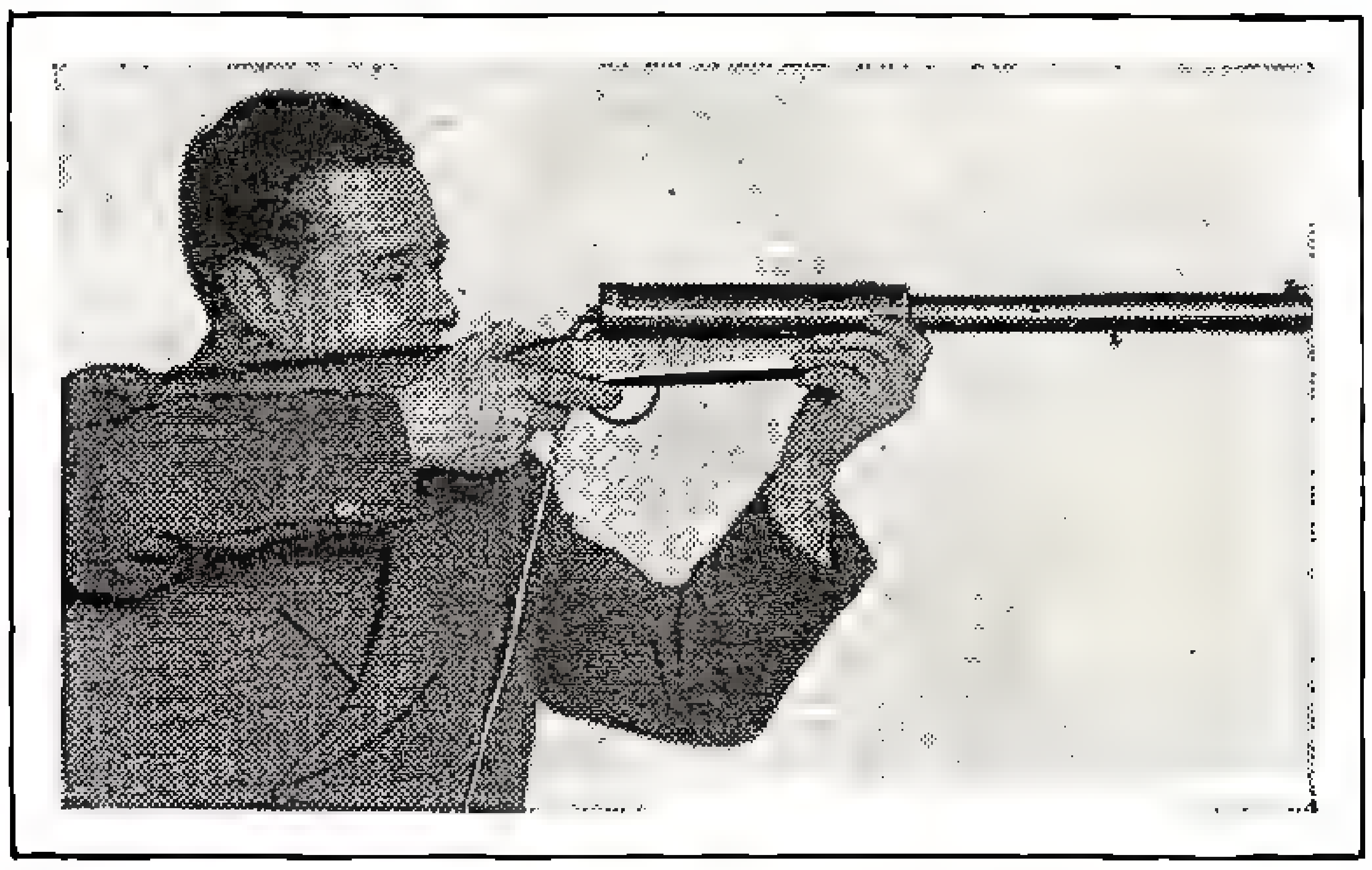
ADD to your list of incredibilities this tobacco can cigarette factory, which nevertheless is an established fact, as our photo proves, though unlikely to cause stirrings of uneasiness in the council chambers of the country's cigarette manufacturers. The invention is the creation of Dr. Edward P. Delevante, who has built a cigarette roller right into the bottom of the tobacco can. At the twist of a lever the cigarette pops out ready for use, with matches handy for lighting on the side of the tin.

Insulated Babies Grow Faster

TO MAKE your baby grow faster, insulate his crib against the electricity of floor, walls, ground. To slow down his growth, ground his crib with flexible bands of metal. This is the extraordinary conclusion reached by M. Vles, of Strasbourg, France, who conducted such experiments on two groups of three babies. The insulated set grew more rapidly than the grounded trio, presumably pointing to the fact that the electrification of soil and air has a real influence on human growth.

No Noise From Electric Rifle

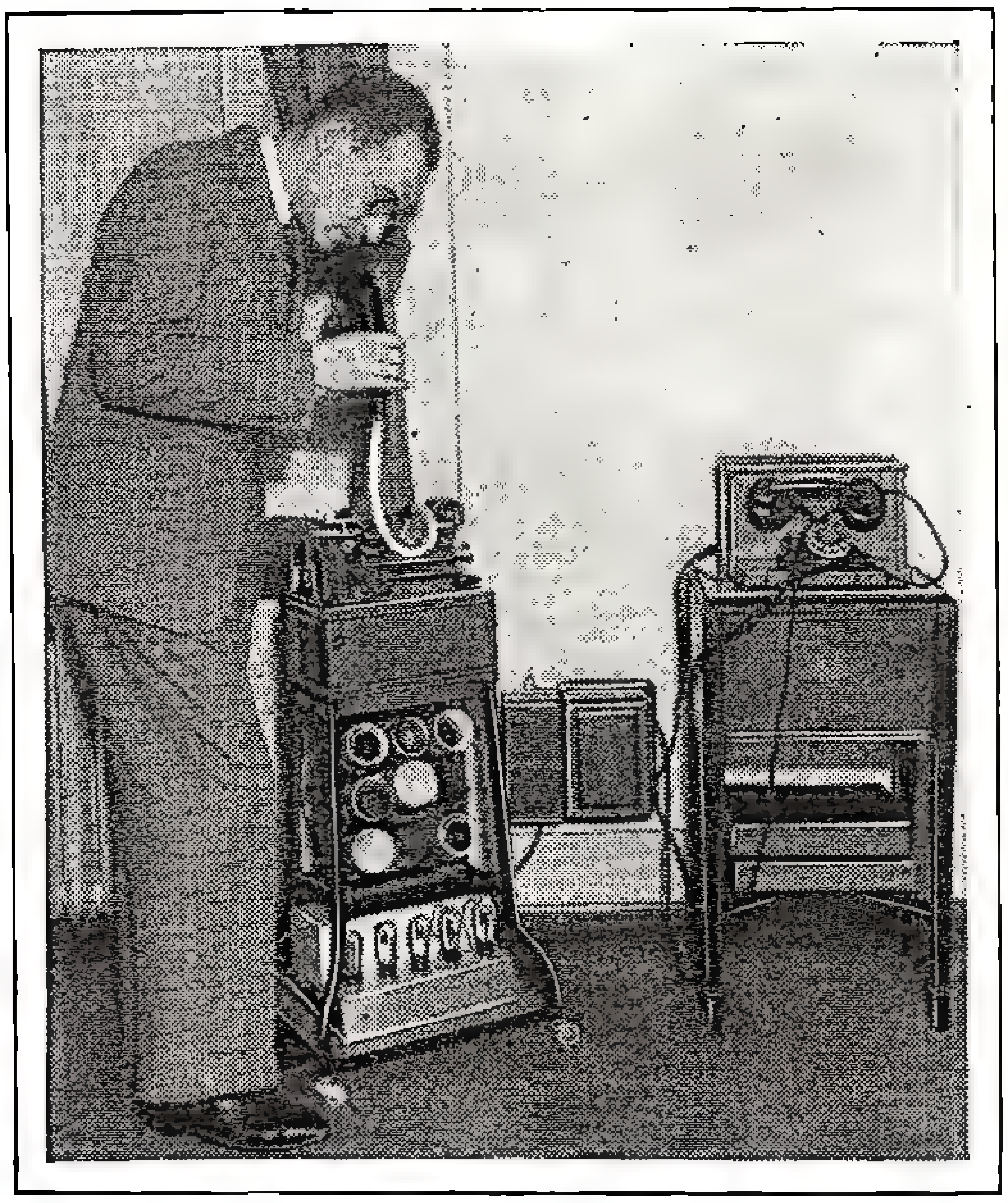
NEW Army recruits suffer badly from nerves after their first session or two on the rifle range; headaches also result from noise and powder fumes. So a rifle instructor has invented an electric rifle, noiseless, powderless, harmless, since it shoots a spot of light instead of a bullet. A luminous target is first projected on the target board. When the electric gun trigger is pressed, a black spot appears on the target at the point where the gun is aimed. An ingenious system of lenses within the barrel, with an electric light bulb as projector, constitutes the mechanism of the rifle.



Light is shot instead of bullets in this electric rifle. It's a projection device, working through lenses in the barrel.

The Perfect Secretary—a Machine

LEAVING his office for a few minutes, M. Keiser, inventor of the televoice, hooks up the gadget shown below with his telephone. Drama ensues. When phone rings, the machine lifts receiver, advises via phonograph record that "Mr. Keiser is not in, but requests that you leave your message, which will be automatically recorded." Through a dictaphone arrangement, caller's words are transcribed to wax cylinder, whence they are audibly reproduced for Mr. Keiser at his convenience, as often as he wants to hear them.



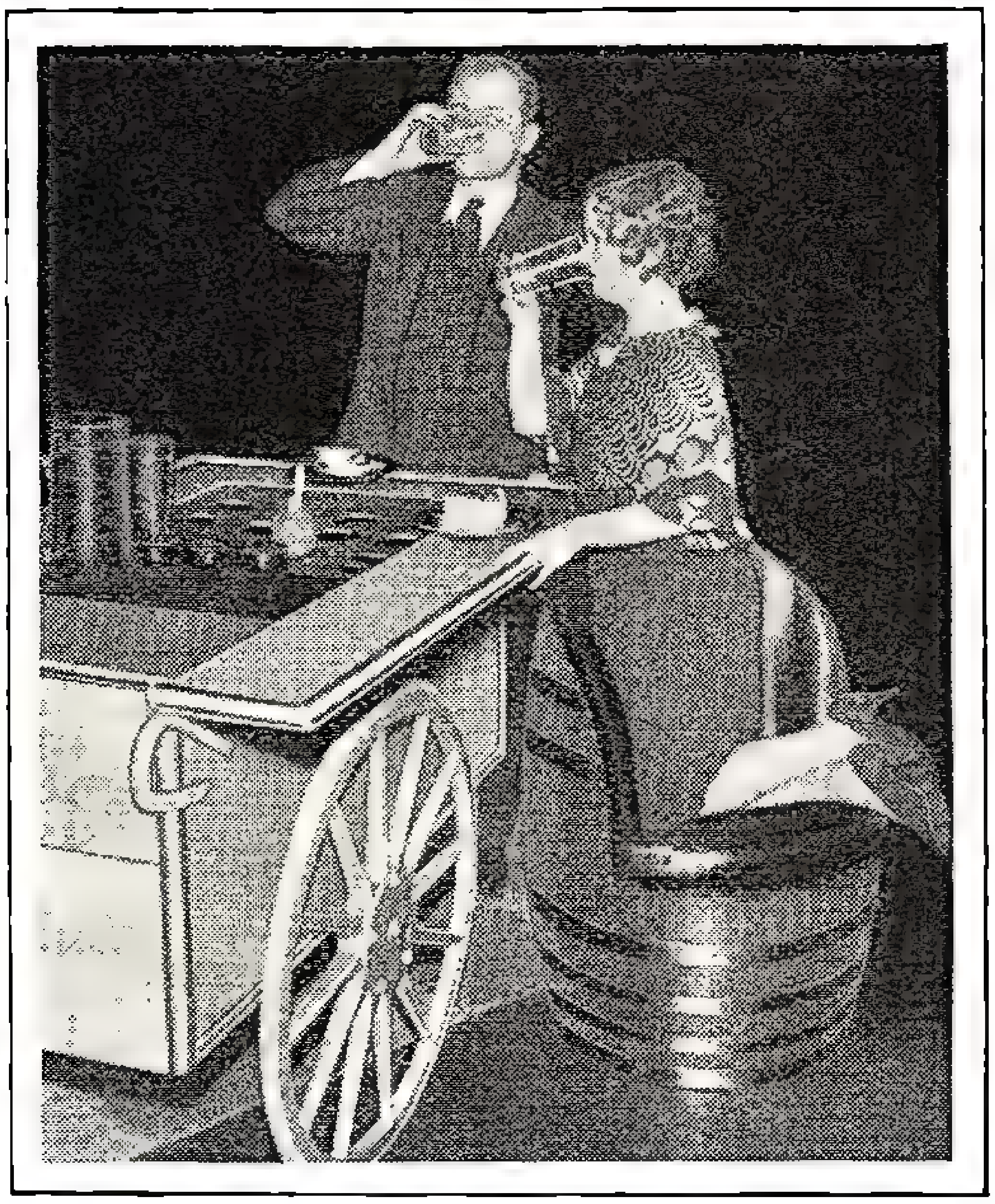
If phone rings when occupant is out, this machine reports fact to caller, takes down any message on the dictaphone.

Explosion of Sun Overdue

ACCORDING to calculations of astronomers, an explosion of the sun is some 600,000,000 years overdue, assuming that our private star has the same number of outbursts as the average star—which may not necessarily be correct. A definite number of star explosions occur in a definite area of space in a given period, and from these facts it is computed that the average star explodes once in 400,000,000 years.

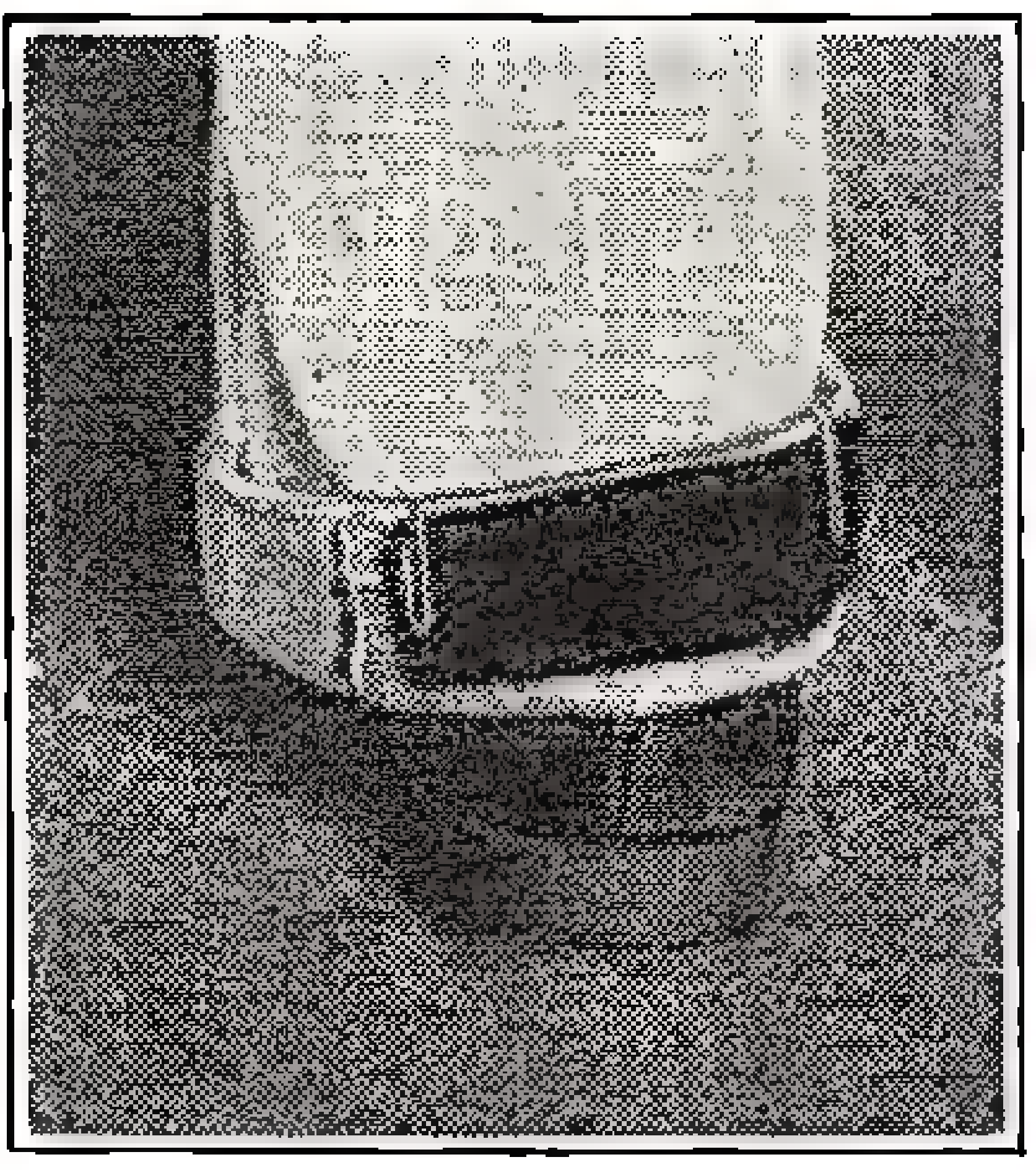
Household Party Bar All Ready for Repeal of Prohibition

A SO-CALLED "rumpus cart" or portable bar has been put on the market by enterprising furniture manufacturers who anticipate the repeal of prohibition. As shown in action at the right, the outfit provides sandwiches as well as liquid refreshments of a more or less convivial nature, and even furnishes a chair in appropriate barrel design to harmonize with the ensemble.



Space for cold drinks as well as a sandwich counter and barrel chair are provided in this portable bar, anticipating return of beer and consequent market for household bar to dispense spirituous cheer.

Cellophane Tail Light for Hikers

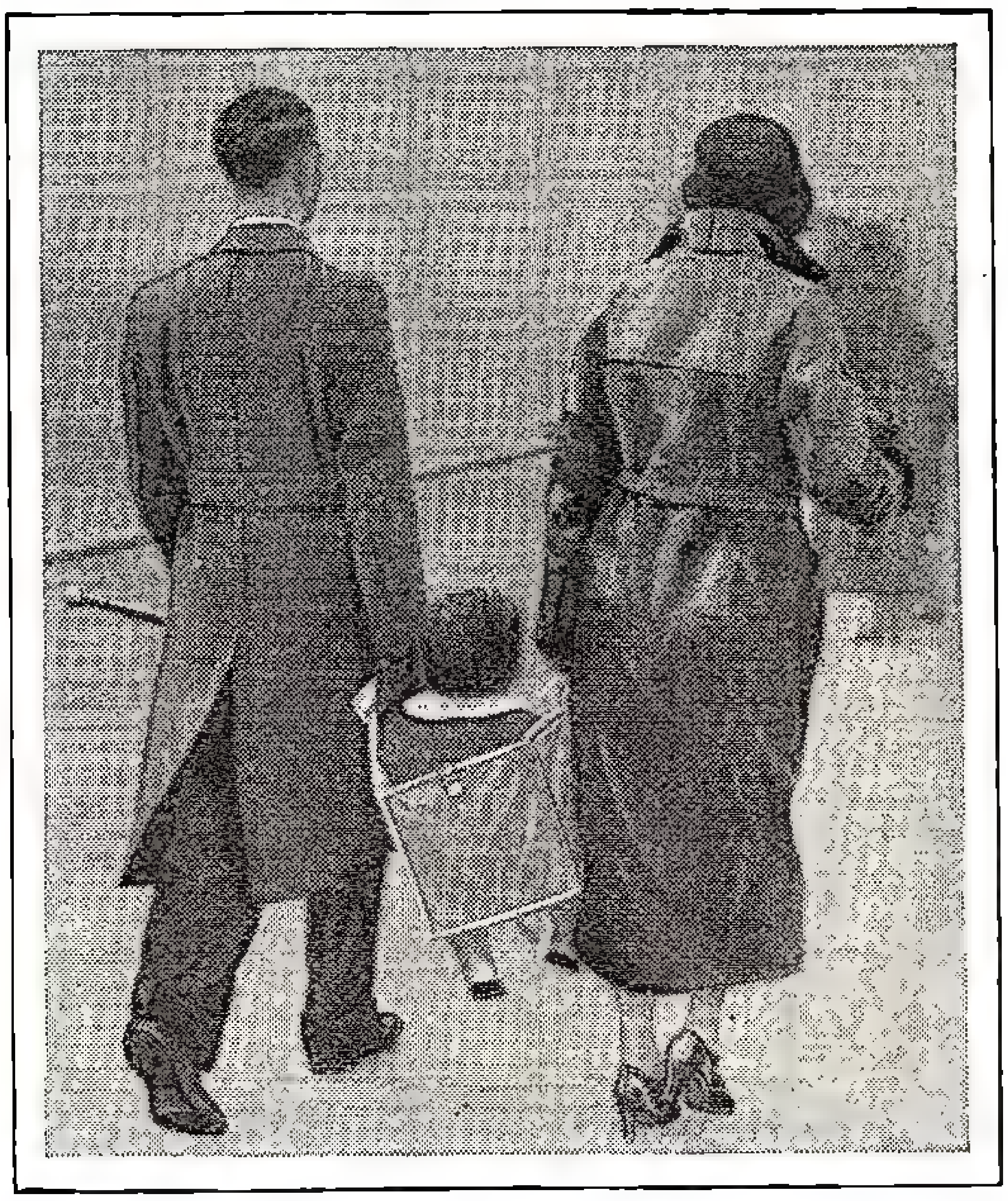


Foil-backed cellophane tail light.

RED warning lights for hikers walking along dark roads at night can be made from a section of red cellophane or celluloid, attached to the trouser cuff as shown. A piece of tinfoil is placed behind the cellophane to act as a reflector.

A Transportation Problem Solved

HARKING back to Indians who carry their papooses on their backs in slings, the parents shown in the picture below have improved on the idea and have worked out a scheme which divides the labor of carrying the baby between father and mother. Junior is inserted in a canvas box, legs sticking through, and one side carried by each parent.



Seated in canvas chair, three-year old views passing throng with aplomb. Advantage to parents: 50-50 distribution of transportation effort.

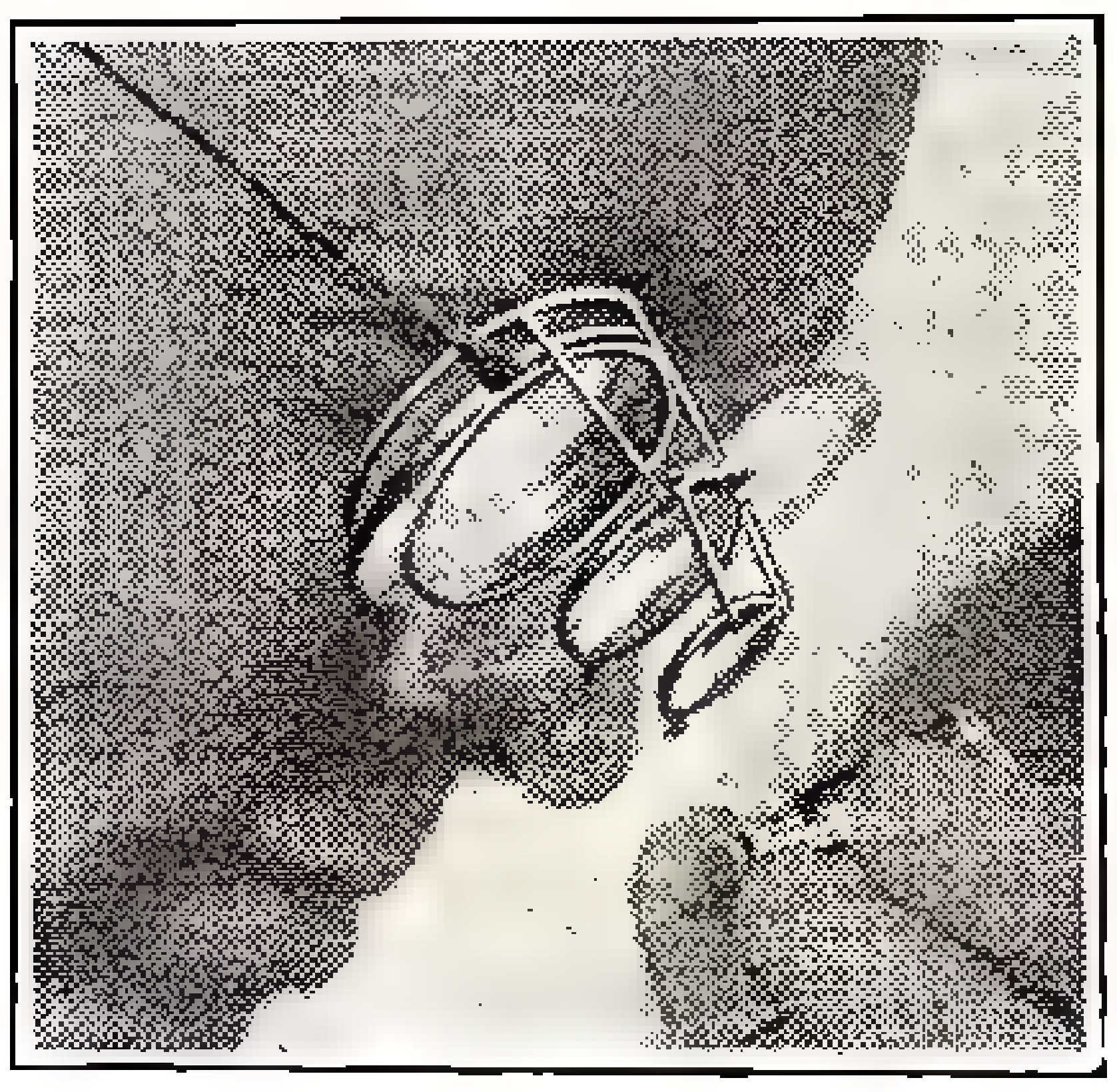
Credits Insects With Intelligence

INSECTS long have held the palm among scientists as examples of creatures with marvelously developed instincts, rigid but unalterable, which carry them through the normal vicissitudes of life. Now comes Maj. R. W. C. Hingston, noted nature observer, expressing the belief that certain insects may have intelligence as well, this being defined as the capacity to learn. An example is the ability of certain kinds of ants to stitch leaves together to make their nests, several ants cooperating to pull the leaf edges together and suiting their behavior to the characteristics of each individual job.

Triple Magnifier for Jewelers

HERALDED as the first improvement in the familiar jeweler's magnifying eyeglass in 50 years, this triple lens magnifier has been developed by a Hollywood inventor. The lenses are hinged on top, can be used independently or in combination. Result: choice of magnifying powers of two, five, and eight times respectively.

Entire outfit fits over ordinary spectacles.

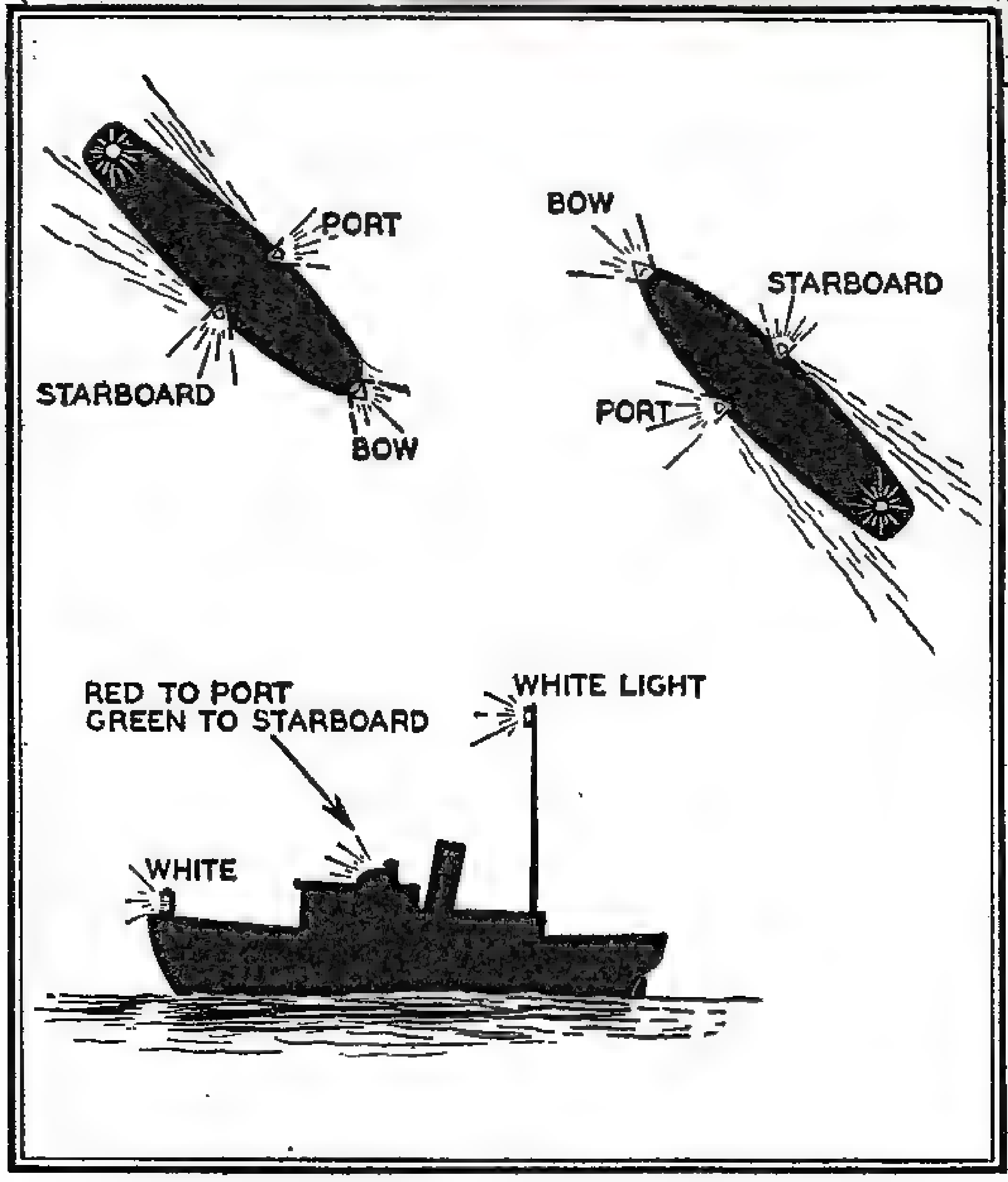


Watch parts pop up eight times natural size when jeweler brings to bear his triple battery of magnifying lenses shown in photo.

SEA COURTS EXPLAIN

Admiral Von Usslar, representative of the German Reich, at left, is conferring with nautical counsel regarding the merits of an accident which is impossible to re-enact for juries without use of models, as otherwise the jurors invariably become confused with the unfamiliar terminology.

The jargon of the sea becomes doubly confusing to laymen who sit on juries that deal with nautical accidents. This article tells how models are used to re-enact the strange "rules of the road" for jurors who have never been to sea.



Here is the usual complement of running lights on small ships. "Green to green, or red to red, — perfect safety; go ahead" is the sailor's operating code.

HOW would you like to sit in on a "traffic" case involving perhaps a million dollars for an accident that took place where there are no roads?

Would the interpretations of the "rules of the road" bother you, especially if there were no avenue names, no curbs, no semaphores, no roads as we know them?

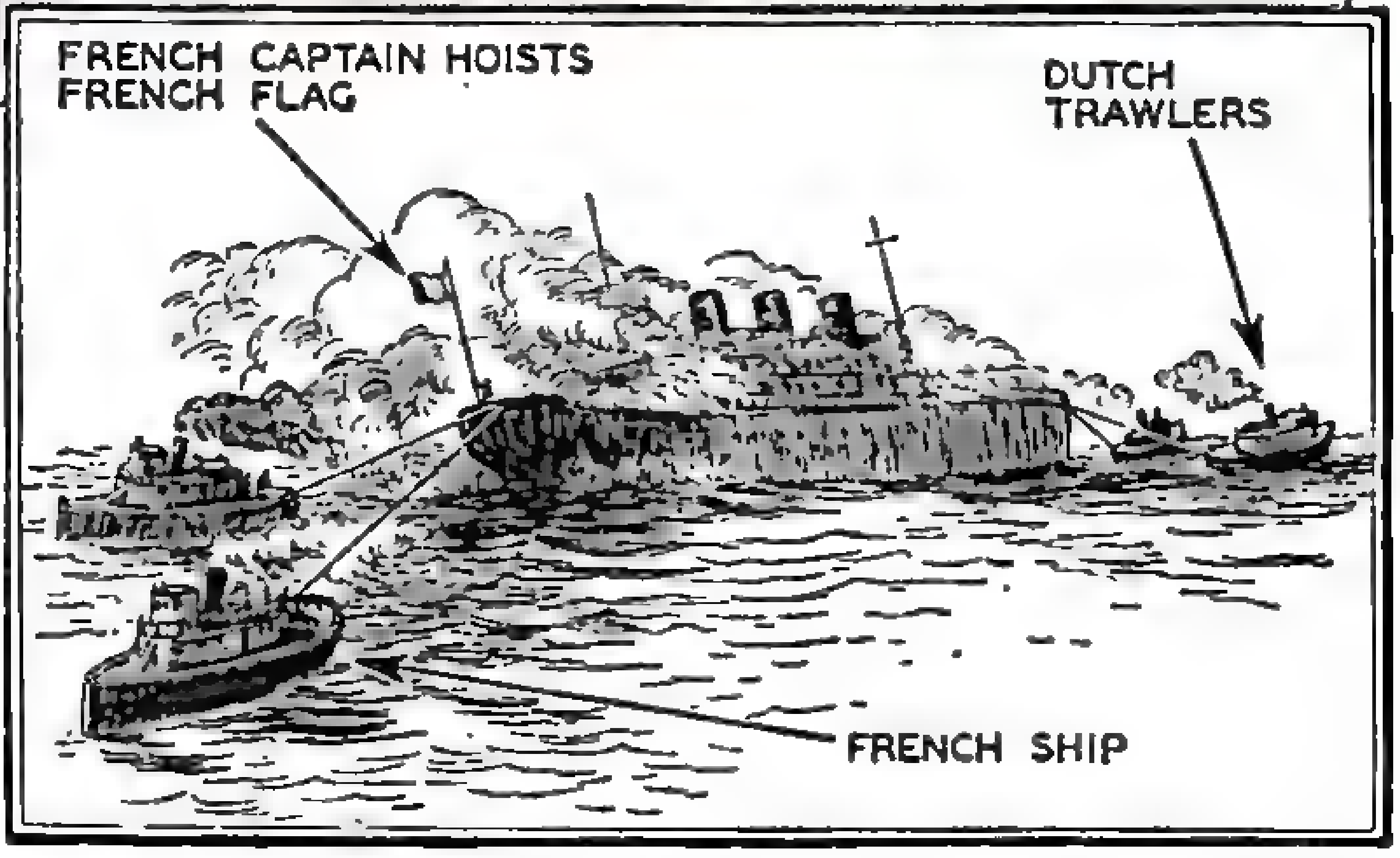
You bet your life they would. As a matter of fact, the most highly specialized judiciaries in the world are the maritime courts where the judge must not only be a sailor who understands the jargon of the sea, but must also be an astute juror versed in the hodge podge of legal meanings and shades.

The usual whereases, and deponent sayeths not of the courtroom are further mired in verbiage when the lingo of the sea is introduced. You can readily imagine what happens when a volley of words like "vessel of first part, being on port tack, deposes and says that vessel of second part, being also on port tack and converging upon course of vessel of first part, which unladen, had right of way over starboard bow dead ahead—," etc., are thrown at an ordinary jury. The result is chaos.

Consequently America, England, France and Germany, all nations who do a great

Accidents with MODELS

Listing heavily as the beam wind strikes her sides, the liner "Atlantique" is here shown drifting toward the Cardiff cliffs of England, a mass of flames. This picture was taken but a short time ago, when the drama shown at right was enacted upon the high seas, demonstrating marine law.


FRENCH CAPTAIN HOISTS FRENCH FLAG
DUTCH TRAWLERS
FRENCH SHIP

A ship afloat without crew is the property of any vessel negotiating salvage. Dutch trawlers hooked to the "Atlantique" at the same time French vessels made fast to the stern. A tug of war ensued, neither nationality victorious until the French captain of the "Atlantique" was put aboard again to raise a French flag on the jackstaff, as shown.

deal of shipping, have their own special courts in Marine Chancery. Here, to make things clear to the jury, who are selected from among seafaring folk, models are used to re-enact the accidents or points of dispute.

The photographs show Admiral Von Usslar, representative of the German Reich, using some of these models in conjunction with charts to re-enact maritime disputes and accidents.

In no other manner could the physical positions of the free vessel and the offending vessel be kept clear in the minds of the untrained men who sit upon the case.

All nations have uniform "rules of the road" in that great International occupancy, the Sea. The courtesies, the lights, the flags and the manner of conducting shipping are all uniform.

Consequently, with so much room at one's disposal, the rules for the high seas are rather simple. The left hand side of a vessel, facing the bow, is the port side. The right hand side is the starboard side.

In sailor's parlance, in which the courts are conducted, port, starboard, port quarter, starboard quarter, dead astern and dead ahead are commonplace designations. Even these terms are fairly clear to a layman. But when one vessel bears down on another, what are the rules to follow?

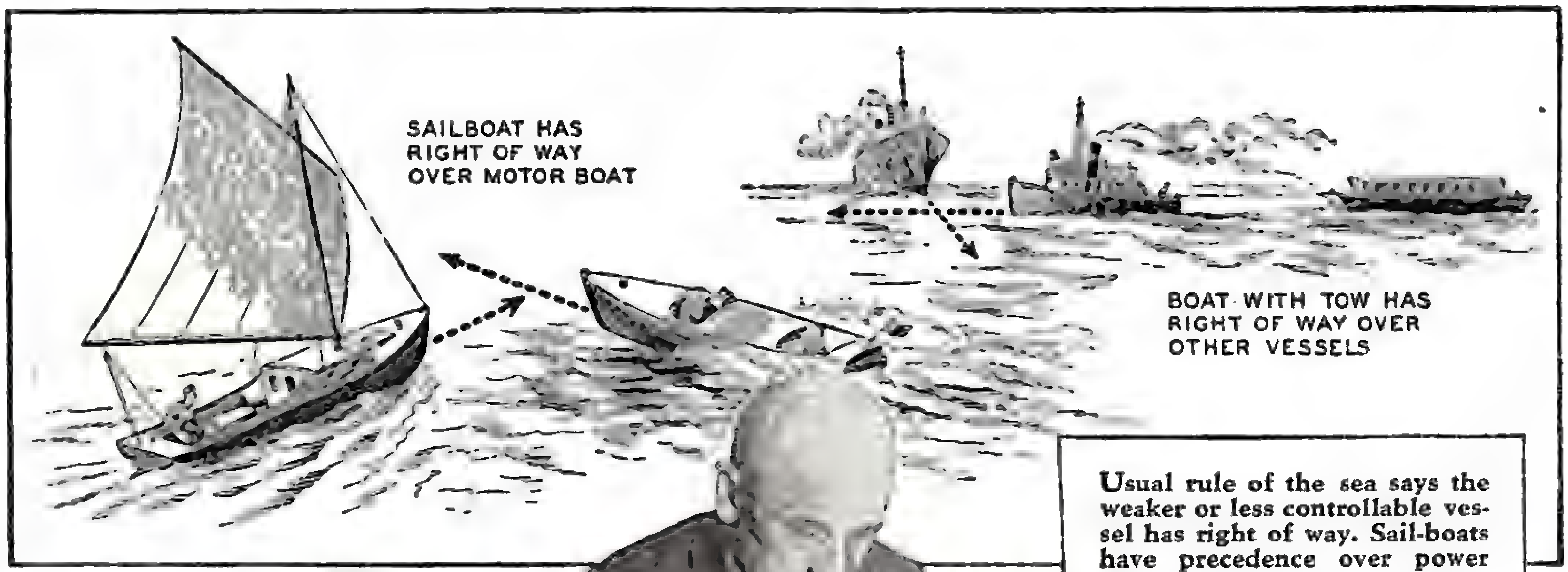
Seamen have little ditties that hold good in cases like this. On the port side are red lights, on the starboard side are green lights, on the bow of the ship is a white light, and high above, toward the stern is another white light. This is required by International law.

When ships approach each other, the sailor recalls, "Green to green, or red to red, perfect safety—go ahead."

During the day this matter is simple, but it is at night when the navigation of the ship becomes confusing and must be conducted according to light.

Any other condition is met by another simple rule. Two vessels meeting head on will signal. If one has any special reason for wanting passage on a certain side, it will sound the whistle first. One blast means the vessel will pass to port, and two means it will pass to starboard. The other

Diagrams Show Usual Privileges and Rights of Way on Sea Highways


SAILBOAT HAS RIGHT OF WAY OVER MOTOR BOAT
BOAT WITH TOW HAS RIGHT OF WAY OVER OTHER VESSELS

Usual rule of the sea says the weaker or less controllable vessel has right of way. Sail-boats have precedence over power vessels, boats with tow have right of way over all others, because they can't easily dodge out of the way of other ships.

Models, correct as to main particulars, are used by Admiralty courts all over the world. Here is a set in use in the New York Customs Department where the fading terminology of the clipper ship era is made forcibly visible to the jurors through the use of models. Models are built to scale and arranged to re-create the exact conditions of accidents.

vessel must answer according to the whistle signal heard, with either one or two blasts, as the case may be, and swing off accordingly.

For closed waters, there are a host of rules, such as harbor conduct, etc., that you can readily see would be necessary, and which are too lengthy to go into here.

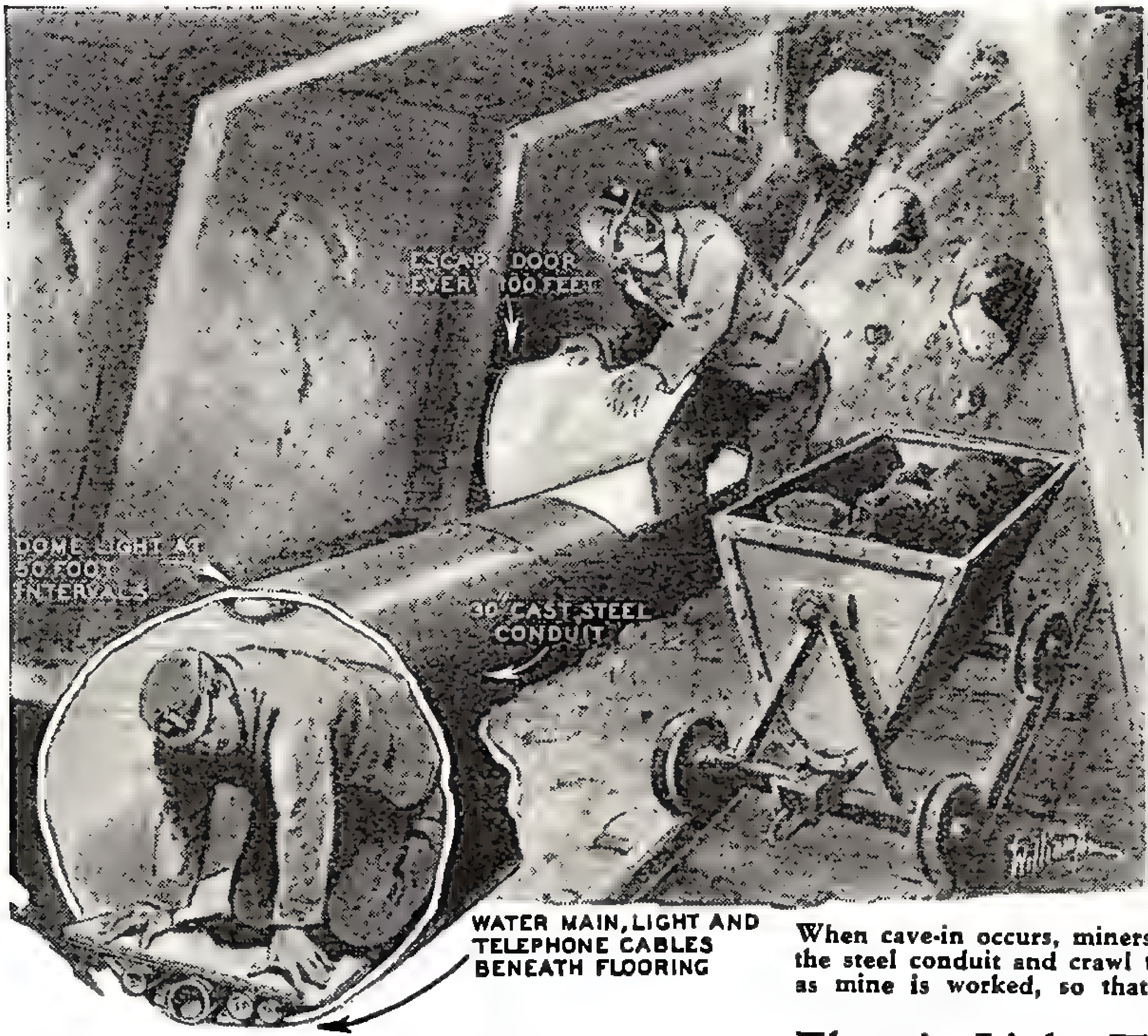
But it is the handling of just such infringements that is the specialty of the marine courts. And this is where the unusual interest in these cases is brought to notice: Not only does the special terminology smack of romance, not only is it an interesting commentary on legal procedure to watch cases enacted with models and maps, but many poignant and unusual things crop up to brand this type of court as one of the most dramatic of all. Let us enact a typical accident, reducing the legal jargon to plain everyday English.

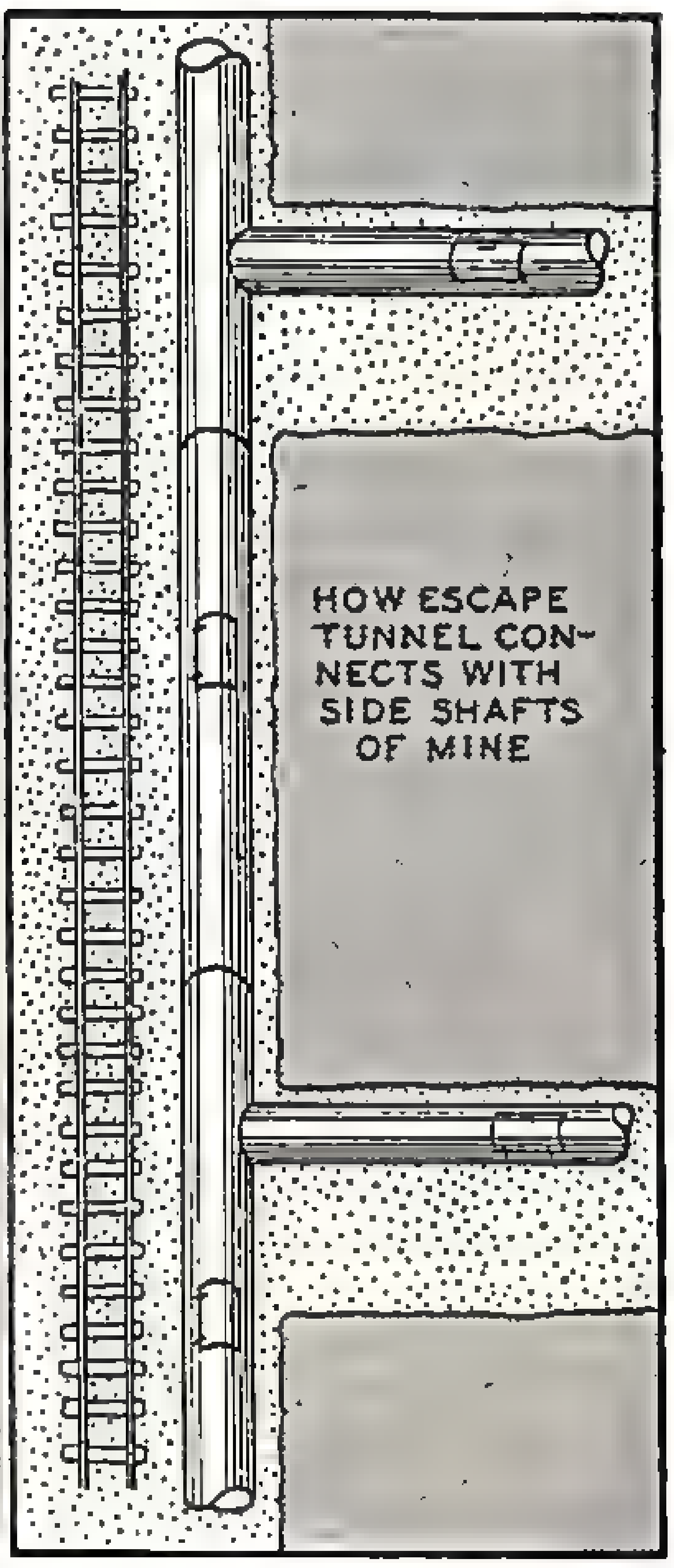
Ship A is proceeding in a fog along toward evening. At intervals of two minutes she is required by the rules of the road to toot two blasts of her whistle. It is dark and foggy, and though her lights are lit, they cannot be seen by Vessel B, who is approaching head on. Both ships hear each other and so are proceeding slowly.

Suddenly the fog lifts for a minute, and each ship can now see as well as hear the other. But as is the case in almost every instance, when the fog lifts there is a slight wind, and this time the skipper of vessel A, seeing the other ship's lights,

(Continued on page 136)

Escape Conduit Rescues Trapped Miners


ESCAPE DOOR EVERY 100 FEET
DOME LIGHT AT 50 FOOT INTERVALS
30" CAST STEEL CONDUIT
WATER MAIN, LIGHT AND TELEPHONE CABLES BENEATH FLOORING



When cave-in occurs, miners make for the escape doors in the steel conduit and crawl to safety. Pipes are laid down as mine is worked, so that the pipes cover all sections.

IN THE majority of mine disasters due to explosion and cave-in, few men are killed by the actual falling mass of debris. Most fatalities occur among those who are imprisoned in an air-sealed pocket in the cave-in.

A Los Angeles inventor now proposes to fit mines with an invention that provides a means of escape. Partly buried in the floor of every tunnel is a thirty-inch steel pipe leading to the open air. At intervals of a hundred feet or so there is a closely fitting trap door giving access to the conduit.

In event of a cave-in, the trapped men lift the nearest trap door and crawl out to safety as illustrated in the drawing above. Ventilation is maintained in the pipe at all times, emergency oxygen tanks being available in an emergency.

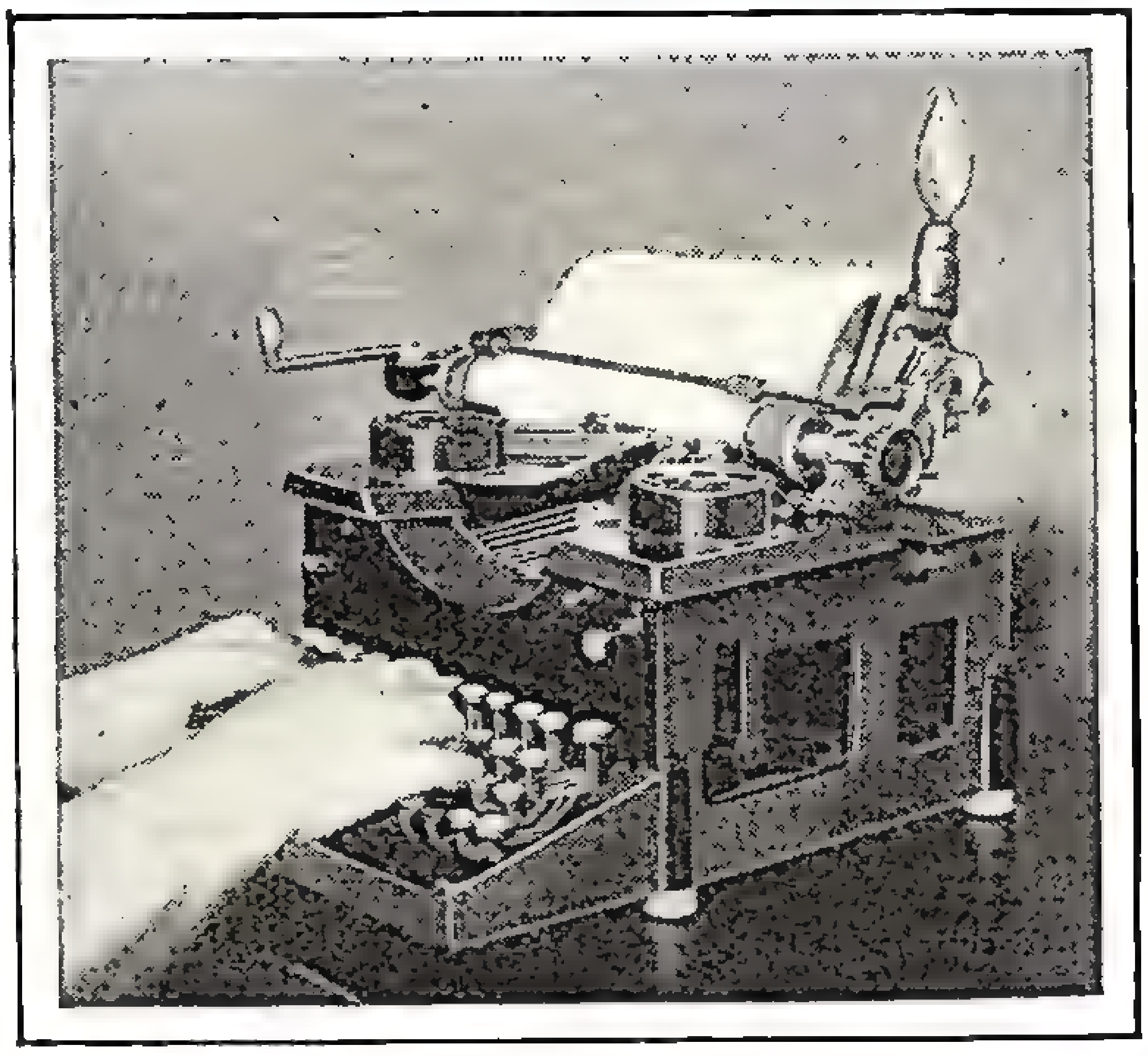
Phonograph Warns Miners of Peril

NEW uses for modern electric phonographs in industrial psychology are suggested by an experiment begun recently at the Wyndham coal mines in Wales. As the miners of this colliery are about to enter the cage to descend into the mine, an electric phonograph starts automatically to repeat warnings and instructions concerning special danger points underground. "Safety First," the record begins. "Search your pockets for matches before you go down. Don't carry tools or blocks of timber in cage with you. Don't work under overhanging coal unless securely spragged." And so on with other desirable warnings.

Electric Light Warns Deaf Typist

A NOVEL arrangement has been contrived by a typist who was unable to hear the warning bell of the typewriter announcing the approach of the margin line. Seven spaces before the end of the line a light flashes on and remains on until a new line is started. This is effected by a small switch attached to the post on which the bell rest is turned on or off by the carriage of the typewriter.

The light is mounted on the end of the carriage as shown.



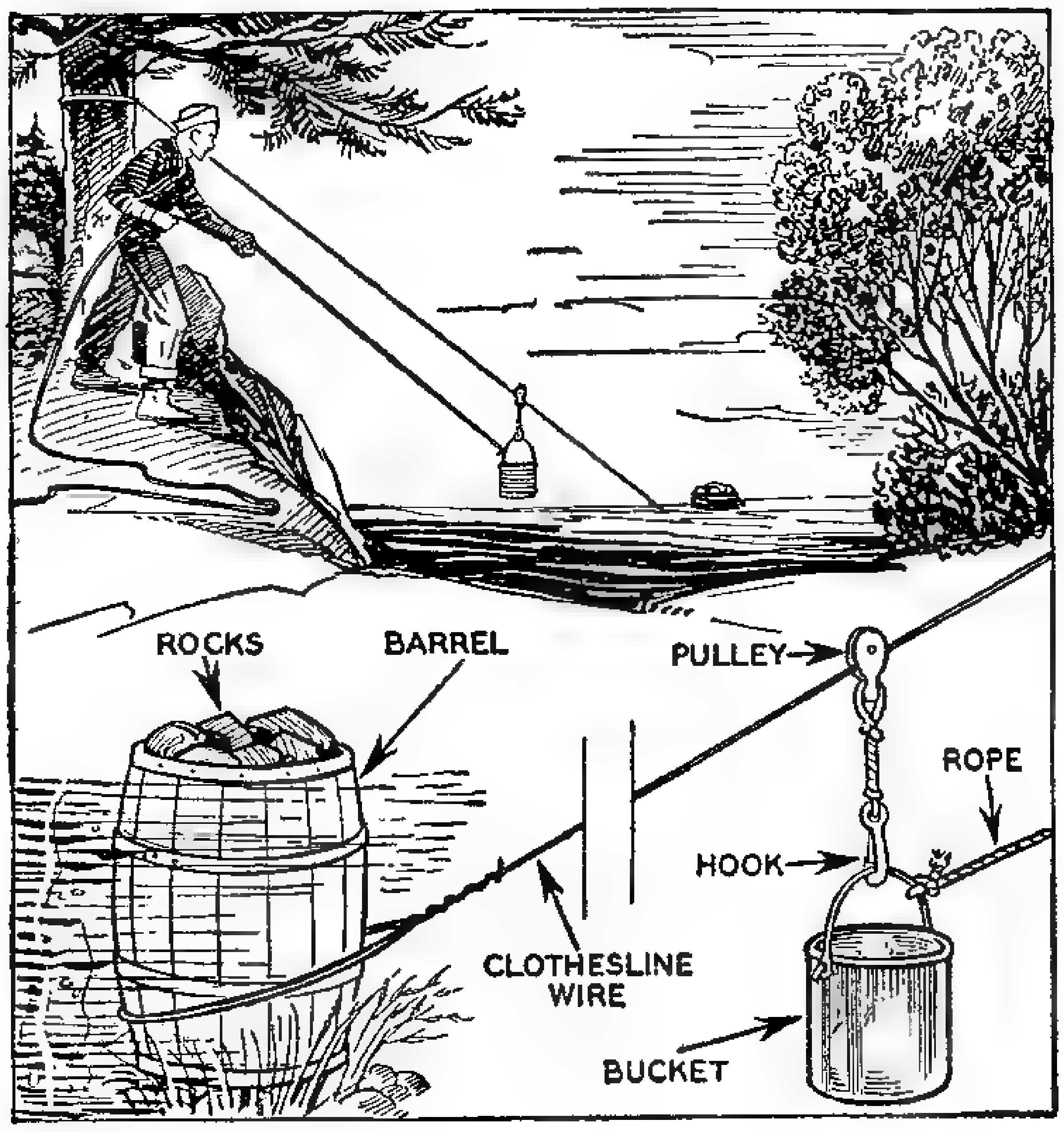
Light turned on by a switch on the typewriter carriage warns deaf typist that the end of line is approaching.

HANDIKINKS

This is one of the most popular departments of Modern Mechanix and Inventions. Here you will find a variety of clever and simple stunts which will come in handy. Their nature is such that they are easily remembered.

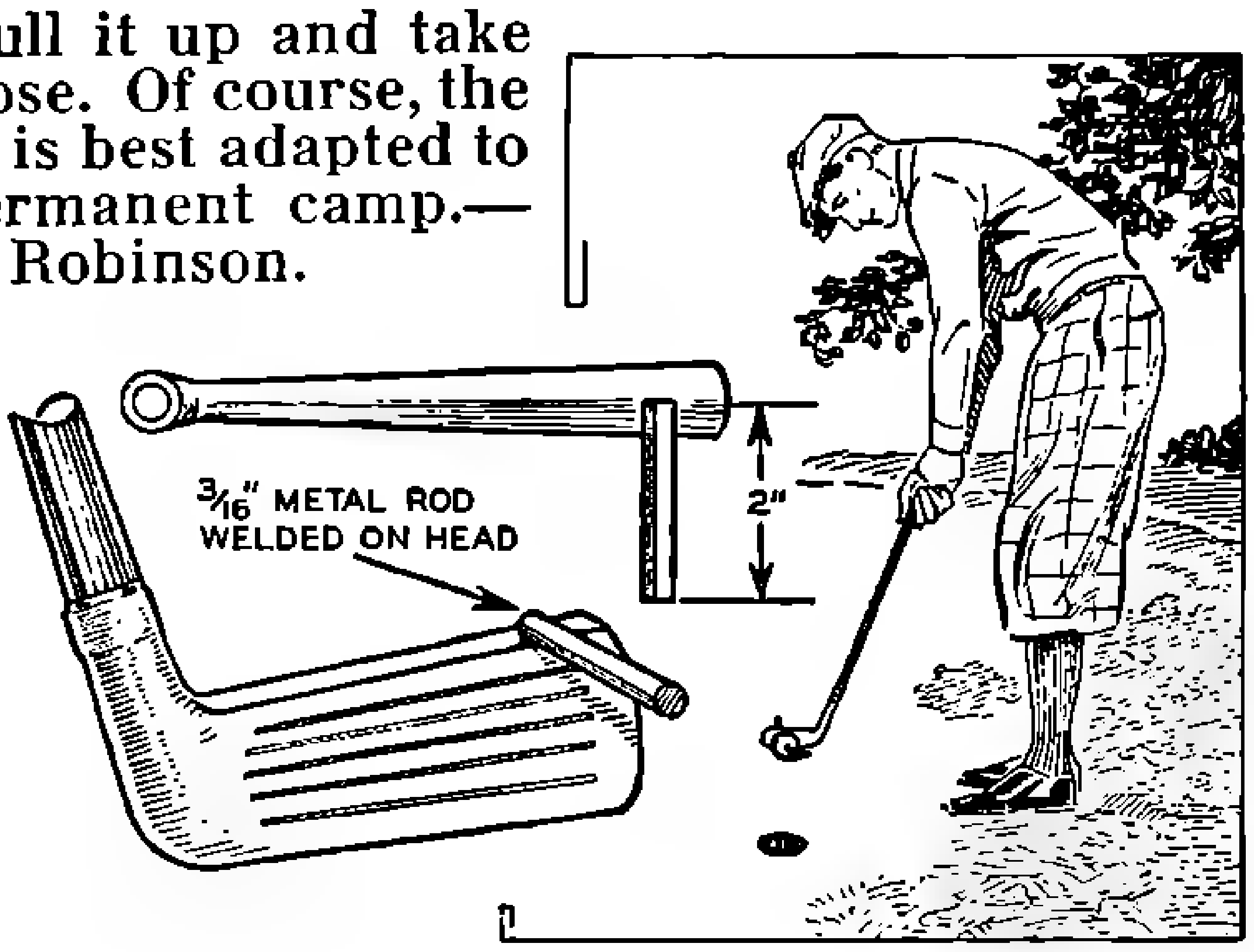
Handy Long Range Dipper for Camp

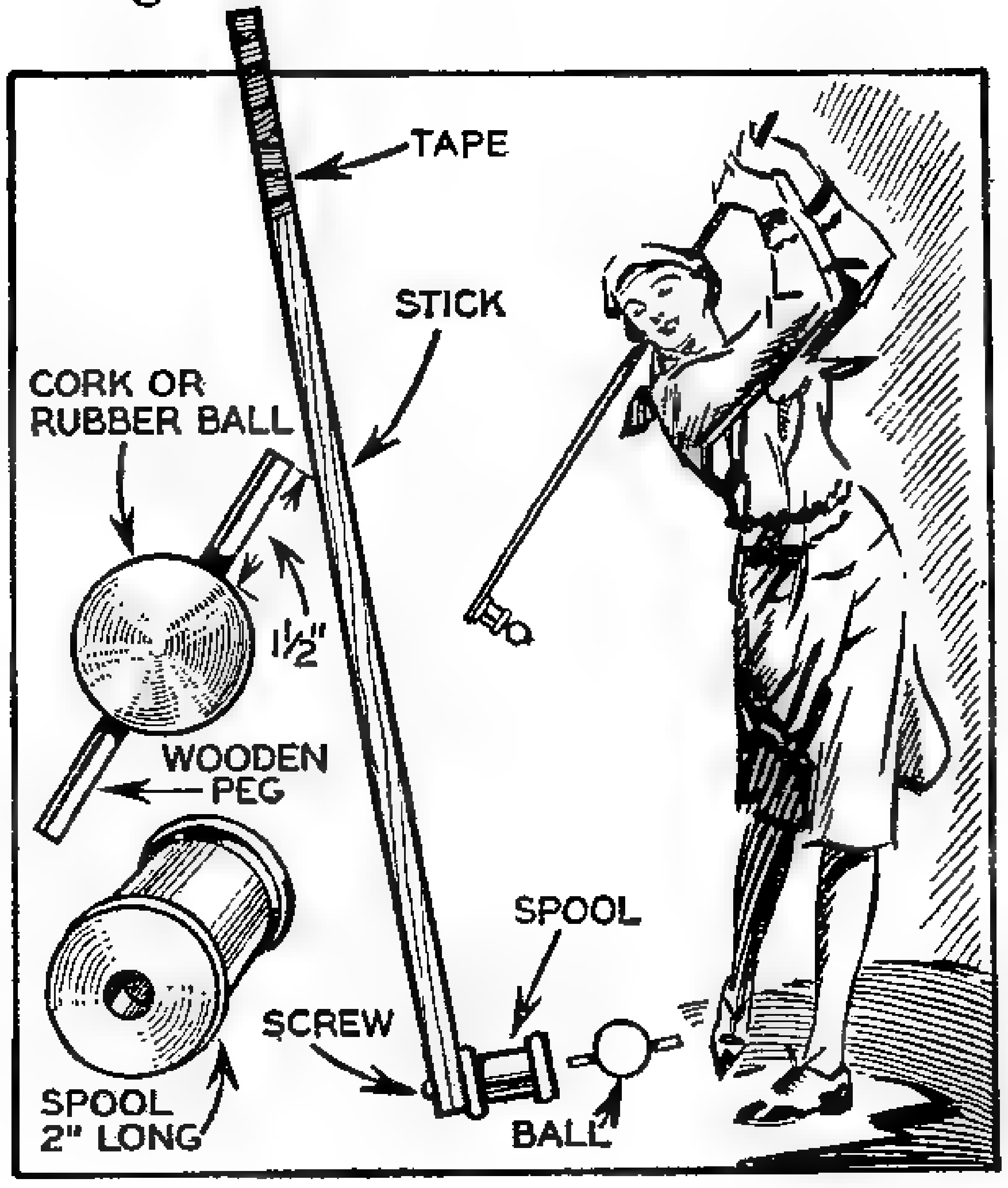
CARRYING of washing and cooking water up a steep slopė offers many tiresome difficulties to the camper. There's a way out, fortunately. Here's what to do. Obtain an old sugar barrel and place it in a pool where the water is deepest, then fill it to the head with rocks. Around the sunken barrel secure the end of a length of clothesline wire, the other end of which should be threaded through a two inch pulley and secured to a post two or three feet back from the brink of the pool, as illustrated at the left. Next suspend a bucket from the two inch pulley and to the bail attach a small rope of sufficient length to reach to the pool below. When the bucket is lowered it upsets and fills with water. The final task is to pull it up and take it loose. Of course, the idea is best adapted to a permanent camp.—Ben Robinson.



Rod Welded to Club Aids Putting

HAVING trouble lining up your ball properly with the hole when on the putting green? Then try this. On the tip of your putter weld a piece of metal rod as illustrated in the drawing. When putting this welded piece serves as a straight edge to sight by. Line it up straight with the hole.—R. A. Phillips.


3/16" METAL ROD WELDED ON HEAD
2"

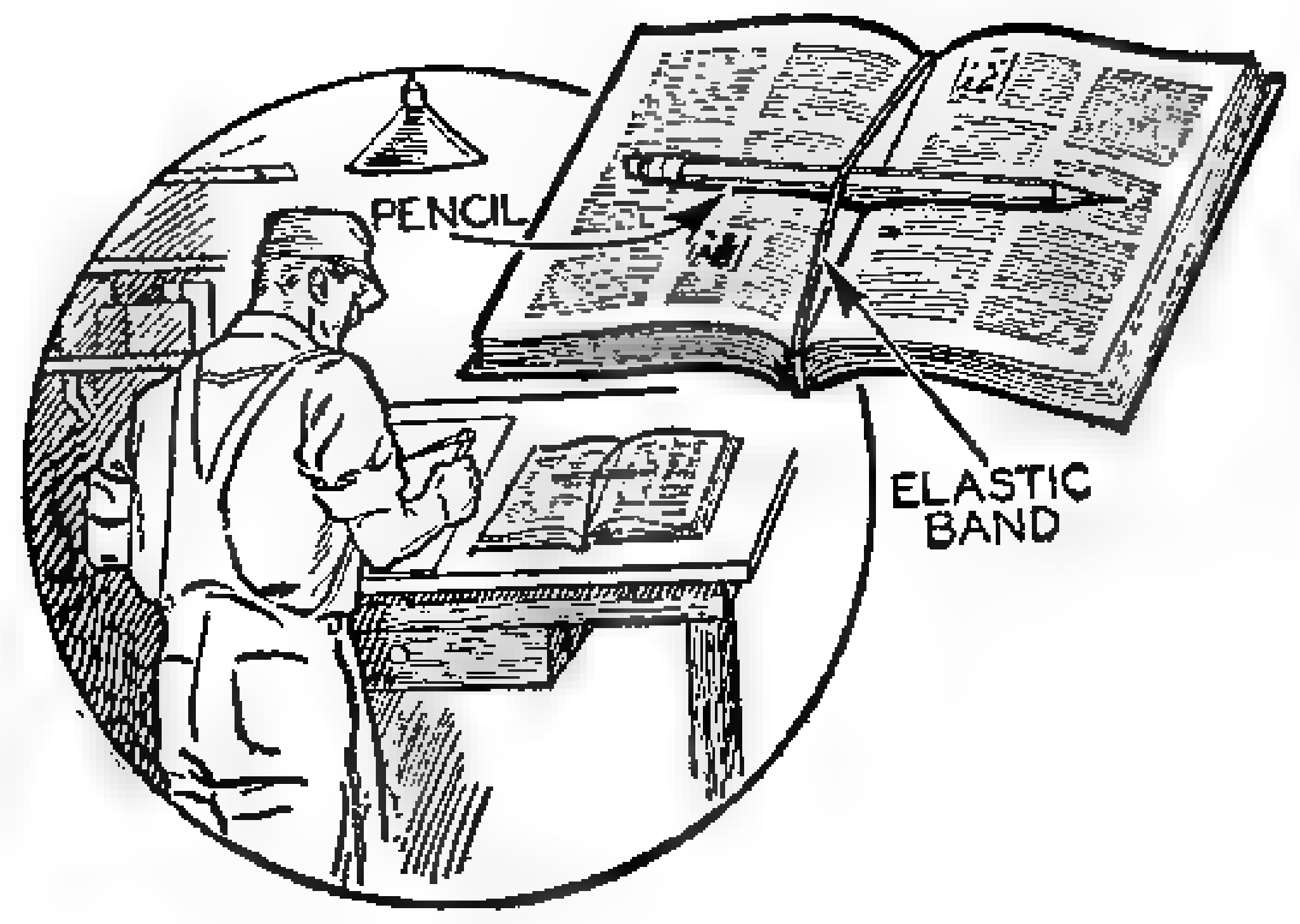


Amusing Game Improves Golfing Stroke

AN AMUSING and effective way to improve your golf stroke is afforded by the use of the simple device illustrated at the left. The golf club in this case consists of a stick as long as the regulation golf club and about ¼ in. thicker, to which is bolted a spool about 2 in. long. Now this instrument is employed to strike a ball made of cork or rubber. Through this ball however is driven a wooden peg. The point of the game is to strike the ball in such a manner that the peg will be caught in the hole in the center of the spool. Practice with the club will improve your drive since unless struck accurately the peg will not be caught by the spool. —Louis Andrews.

Keeps Book Open

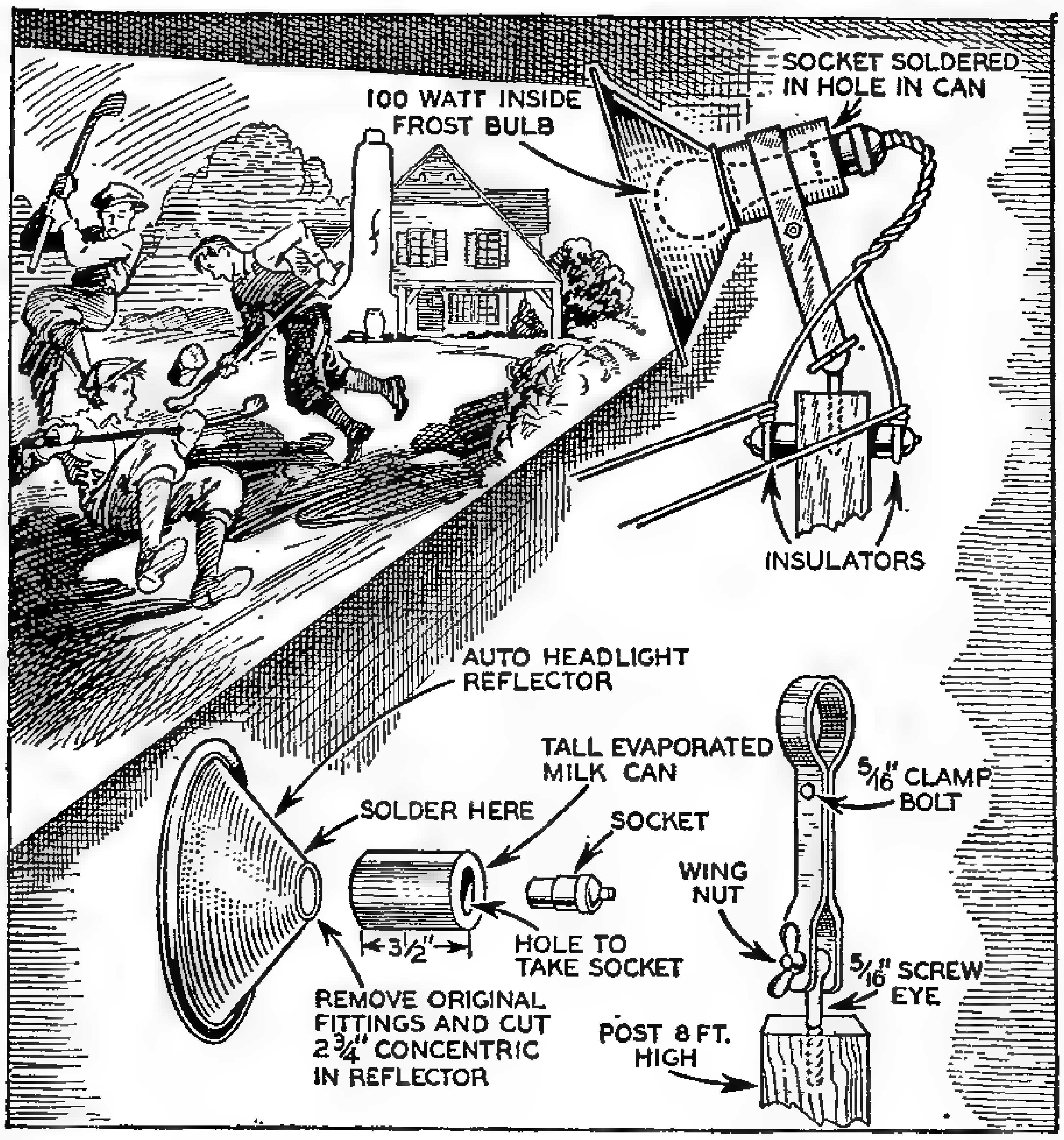
A BOOK or magazine that won't stay shut can be an awful nuisance. Here, however, is a way to cure a stubborn book of its irrepressible desire to get closed again. Simply stretch an elastic band around the center, as illustrated at the right, and then slip a pencil underneath the band. —Altamont Cole.

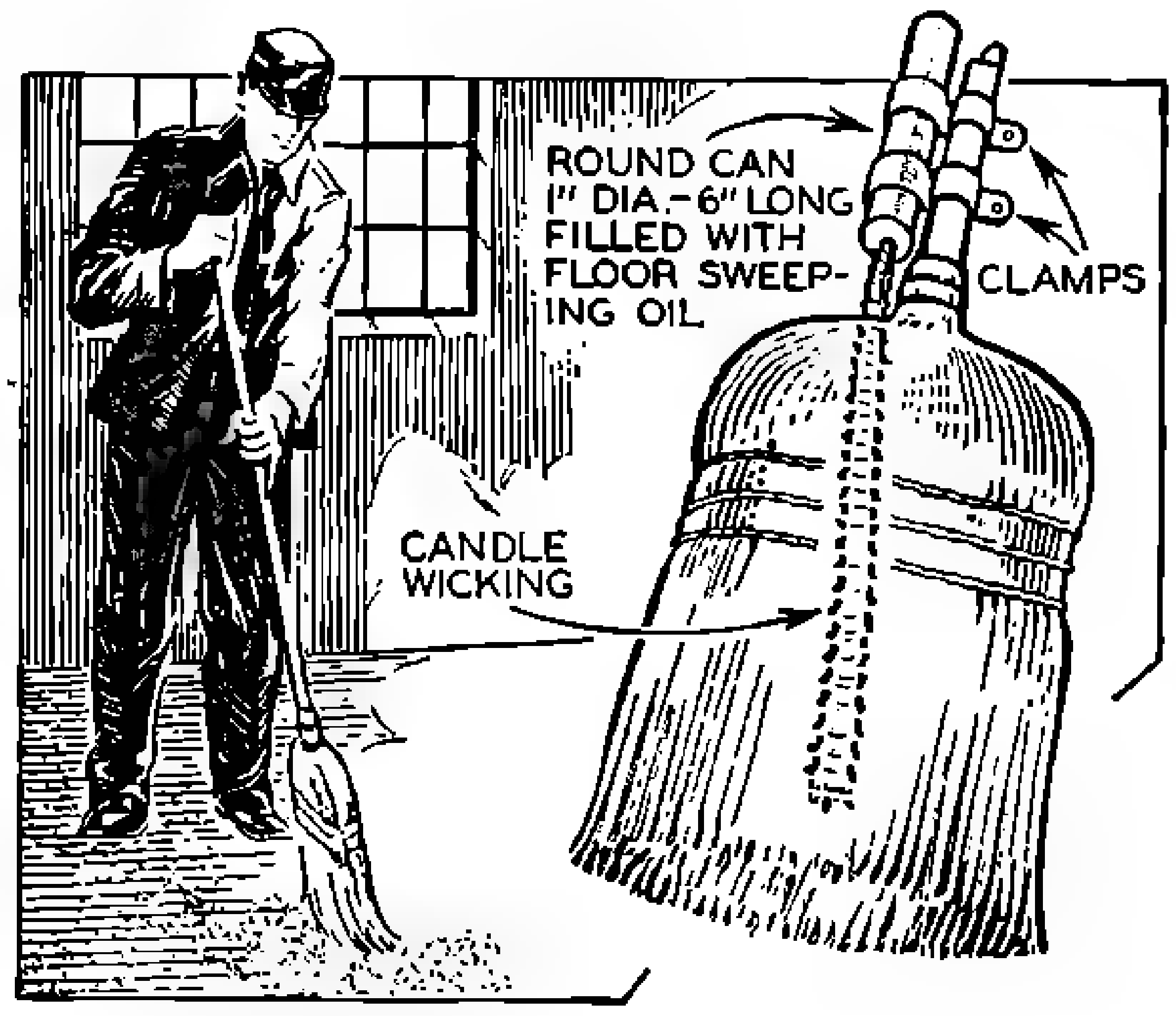


Miscellaneous Handyman Items

Lights for Outdoor Games

FLOODLIGHTS are the most economical means of outdoor illumination. A very efficient light can be made for a few cents with an old auto headlight reflector and a 100 watt lamp bulb. Accompanying drawing shows the simplicity of the construction. Here's one important point: the lamp bulb must set deep into the reflector to obtain the proper focal position. So a 2½" hole is cut in the back of the reflector to receive a long necked bulb. Before soldering the lamp socket permanently in the end of the can, a bulb should be put in place and moved in and out until a point is found where the floodlight yields a spread of white light free of all dark rings and spots. For best results, a highly polished reflector should be used. To safeguard the polish from the elements, a disk of clear glass can be mounted on the front of the reflector. It is well to wrap the brass lamp socket with insulation tape and coat with shellac.—John E. Hogg.


100 WATT INSIDE FROST BULB
SOCKET SOLDERED IN HOLE IN CAN
INSULATORS
AUTO HEADLIGHT REFLECTOR
TALL EVAPORATED MILK CAN
SOLDER HERE
SOCKET
5/16" CLAMP BOLT
WING NUT
3½"
HOLE TO TAKE SOCKET
5/16" SCREW EYE
REMOVE ORIGINAL FITTINGS AND CUT 2¾" CONCENTRIC IN REFLECTOR
POST 8 FT. HIGH

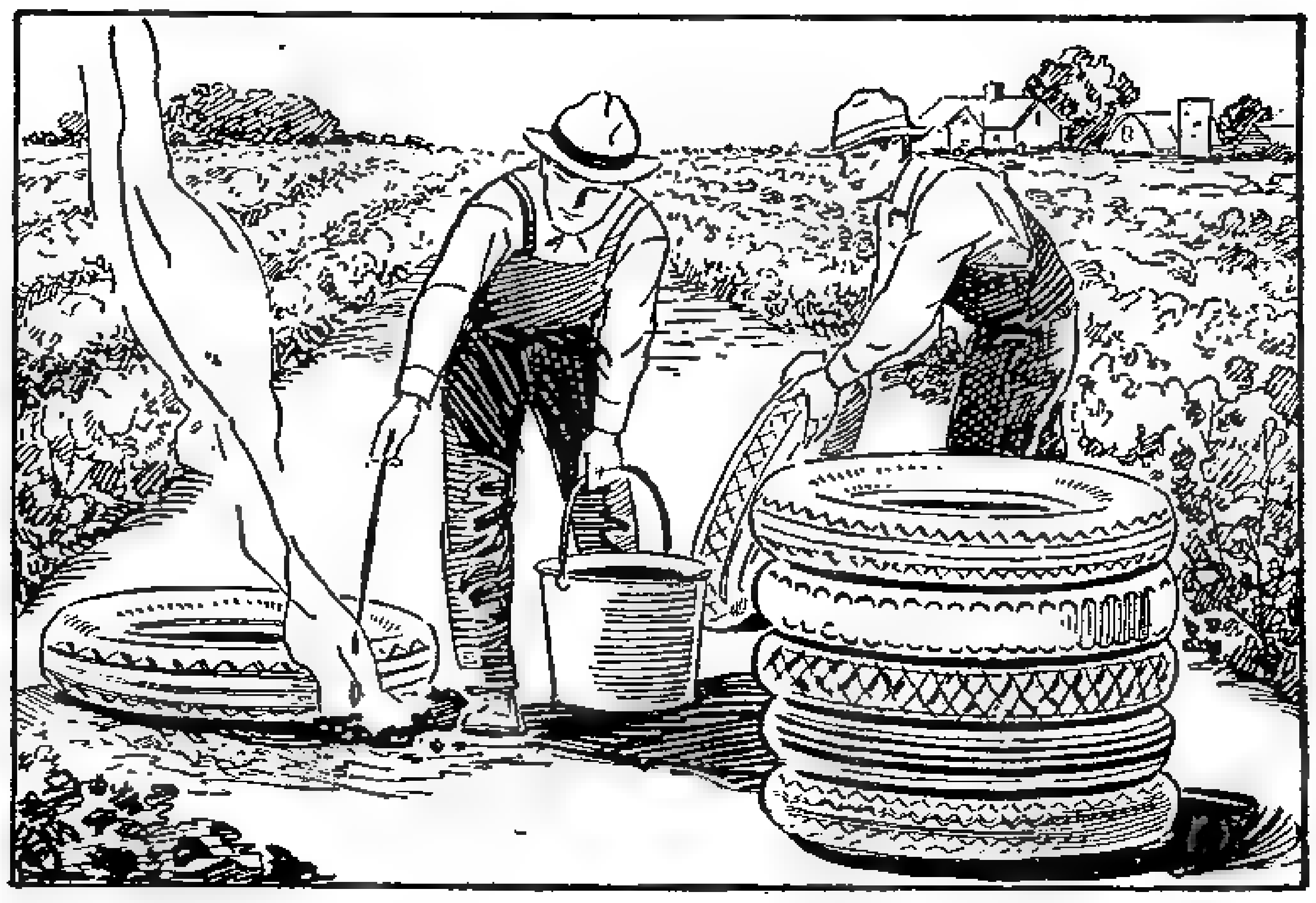

ROUND CAN 1" DIA.-6" LONG FILLED WITH FLOOR SWEEPING OIL
CLAMPS
CANDLE WICKING

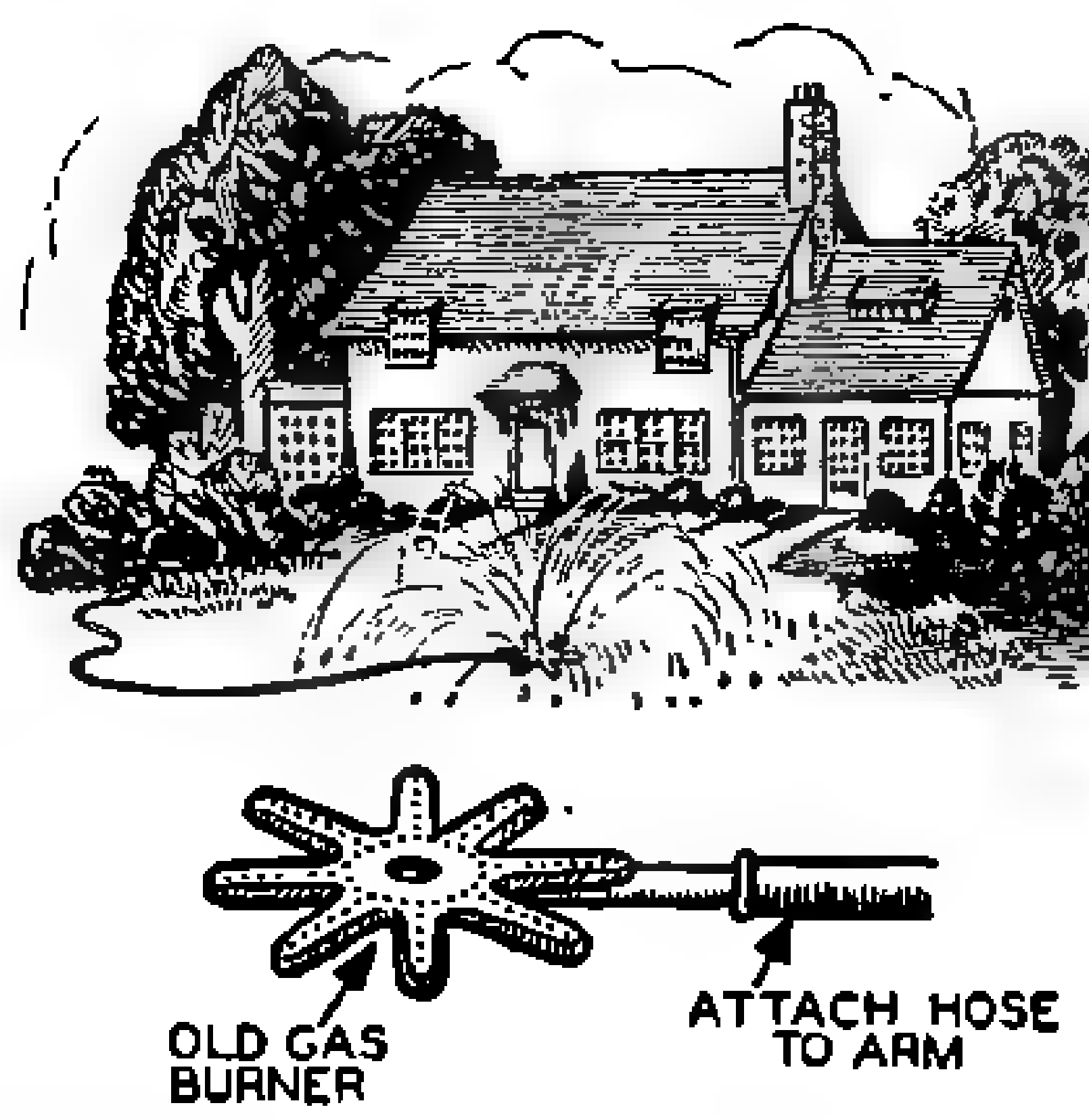
Oiled Broom Sweeps Without Raising Dust

SWEEPING large floor areas is made considerably easier by the use of this device, which renders the strokes dustproof. The small round can shown in the accompanying drawing is attached to the handle of the broom with a pair of clamps. A piece of candle wicking is then fastened to a stiff wire and pulled onto the broom, as illustrated by the dotted line. The other end of the wick is run through a hole in the bottom of the can, which is kept filled with a good floor sweeping oil. This oil works its way down the wick and into the straws, preventing dust and keeping the straws pliable. One filling will last about a week.—A. H. Waychoff.

Fumigate Crops With Old Auto Tires

TRUCK gardeners make use of old auto tires by employing them to fumigate crops, burning them in the paths that criss-cross the fields. The fumes kill the insects and the burned rubber flattens down and hardens once more, providing a firm waterproof surface for the paths.—V. E. Barnes.

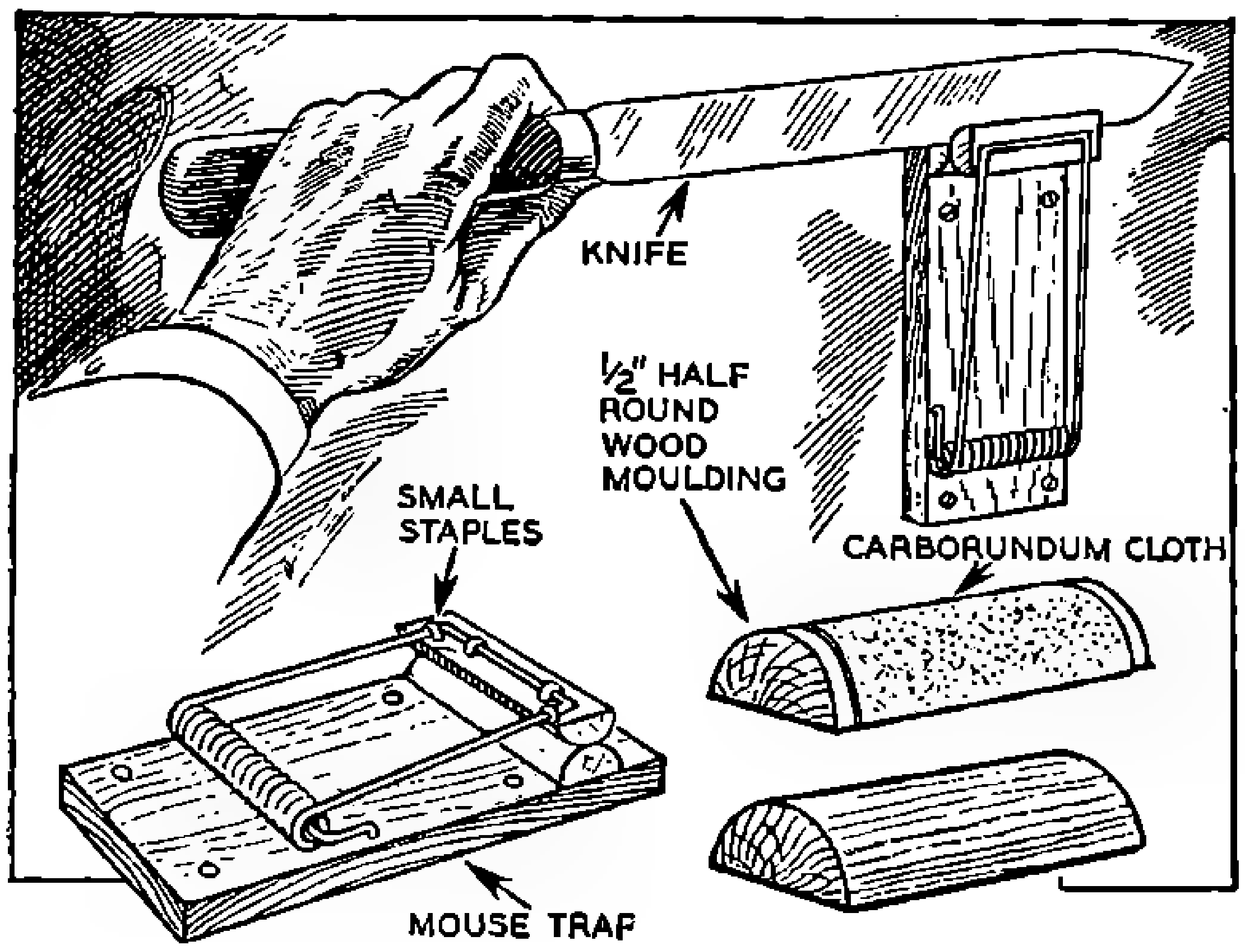



OLD GAS BURNER
ATTACH HOSE TO ARM

Lawn Sprinkler From Gas Burner

THOSE burners found in old gas stoves lying around junkyards can be pressed into service as garden sprinklers. The pipe which leads to the burner proper is attached to the hose by means of a ferrule. When the burner is laid flat on the lawn it spreads the water over a surprisingly wide area. If the points of the burner are each bent down slightly this area will be increased considerably.—Wayne Wheeler.

Four Helpful Household Stunts

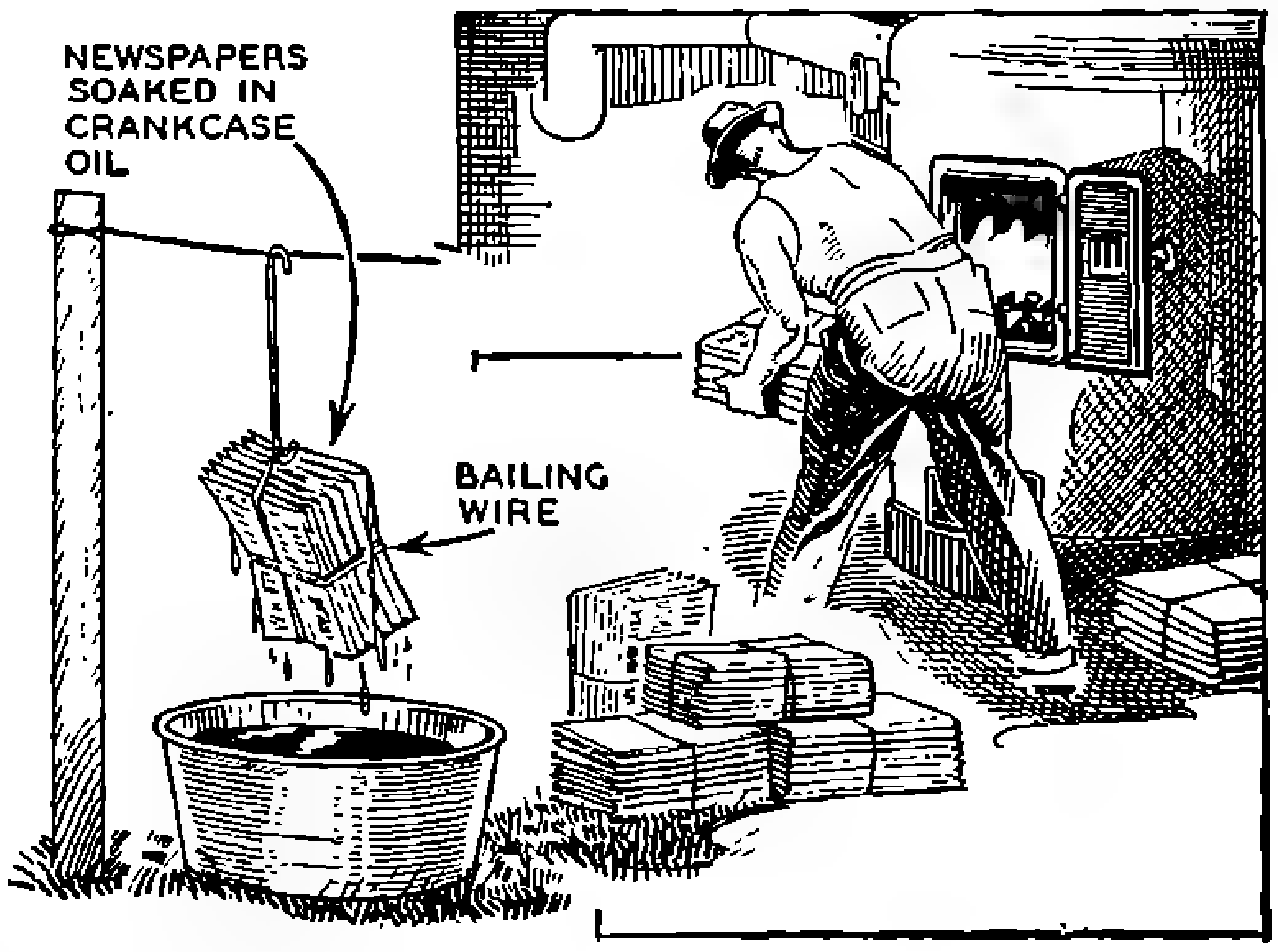


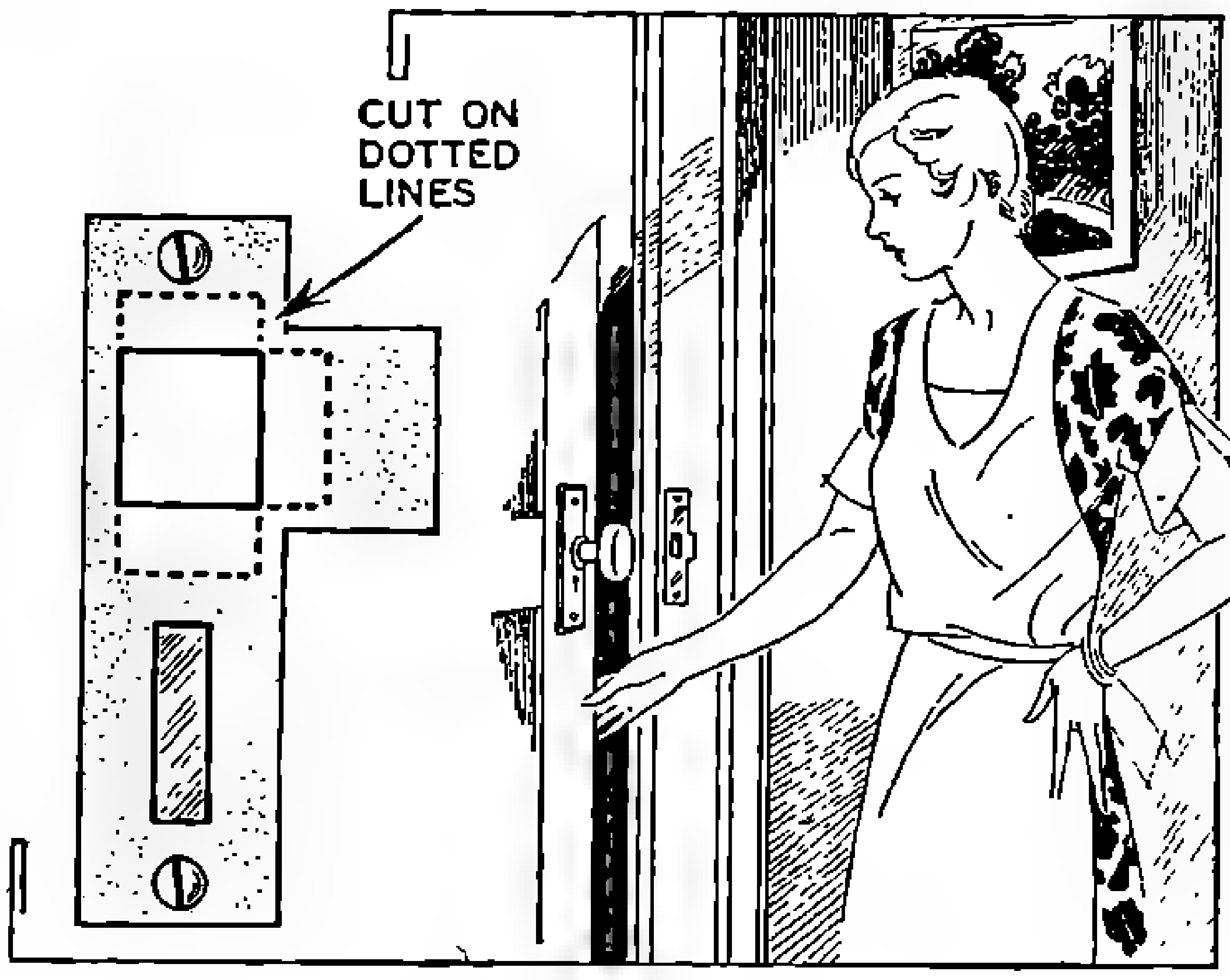
Handy Household Knife Sharpener

ABOUT the best little household sharpener we have run across yet is illustrated in the drawing at the left. Making it is simplicity itself. To two pieces of half inch round wood molding about 2½ in. long are glued pieces of carborundum cloth, as illustrated. These wood pieces are then secured to the spring and base of a piece of mousetrap with small nails. Several small holes are finally bored in the board and the entire contraption is fastened to the wall. The knife is sharpened by slipping it back and forth between the carborundum covered surfaces. The abrasive surface should be as fine a grain as possible to prevent its scratching instead of sharpening.—Ben Lollen.

Cheap Fuel From Waste, Oil Paper

A SLOW burning and very hot fireplace fuel can be had for nothing by utilizing crankcase oil and old newspapers. The papers are folded flat, about nine by twelve inches, and a number of them bound together with baling wire. The blocks are then soaked several hours in a tubful of waste oil, after which they are hung up and drained. They should be stored outside, under cover, and stacked with blocks between to permit air circulation and prevent overheating and the hazard of spontaneous combustion. One block will burn for an hour or two, giving off a good deal of heat at practically no expense.—Bill Crothers.


NEWSPAPERS SOAKED IN CRANKCASE OIL
BAILING WIRE

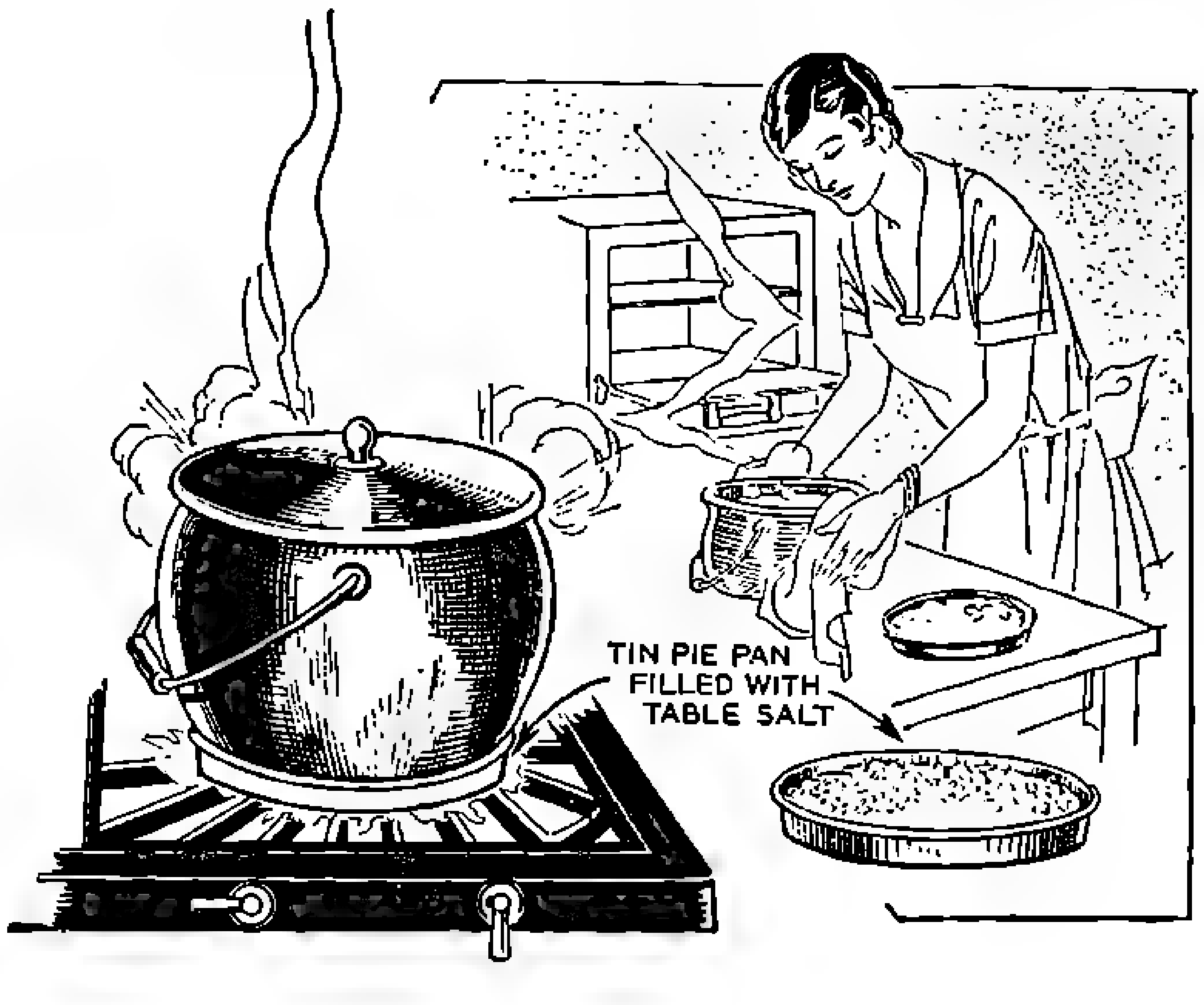


Kink to Reset Door Latch Socket

UNSIGHTLY and difficult shifting of the door latch socket to permit easy latching of warped or sagging doors can be easily avoided. Simply remove the socket frame and with a small three cornered file file down, or up or to the right to enlarge the socket. A knife or chisel can be used to enlarge the latch hole in the wood and the latch frame can be restored to its usual place. Sags or warps of more than one quarter of an inch can be easily accommodated in this way.—Bruce Ellsworth.

Table Salt Prevents Burning of Jam

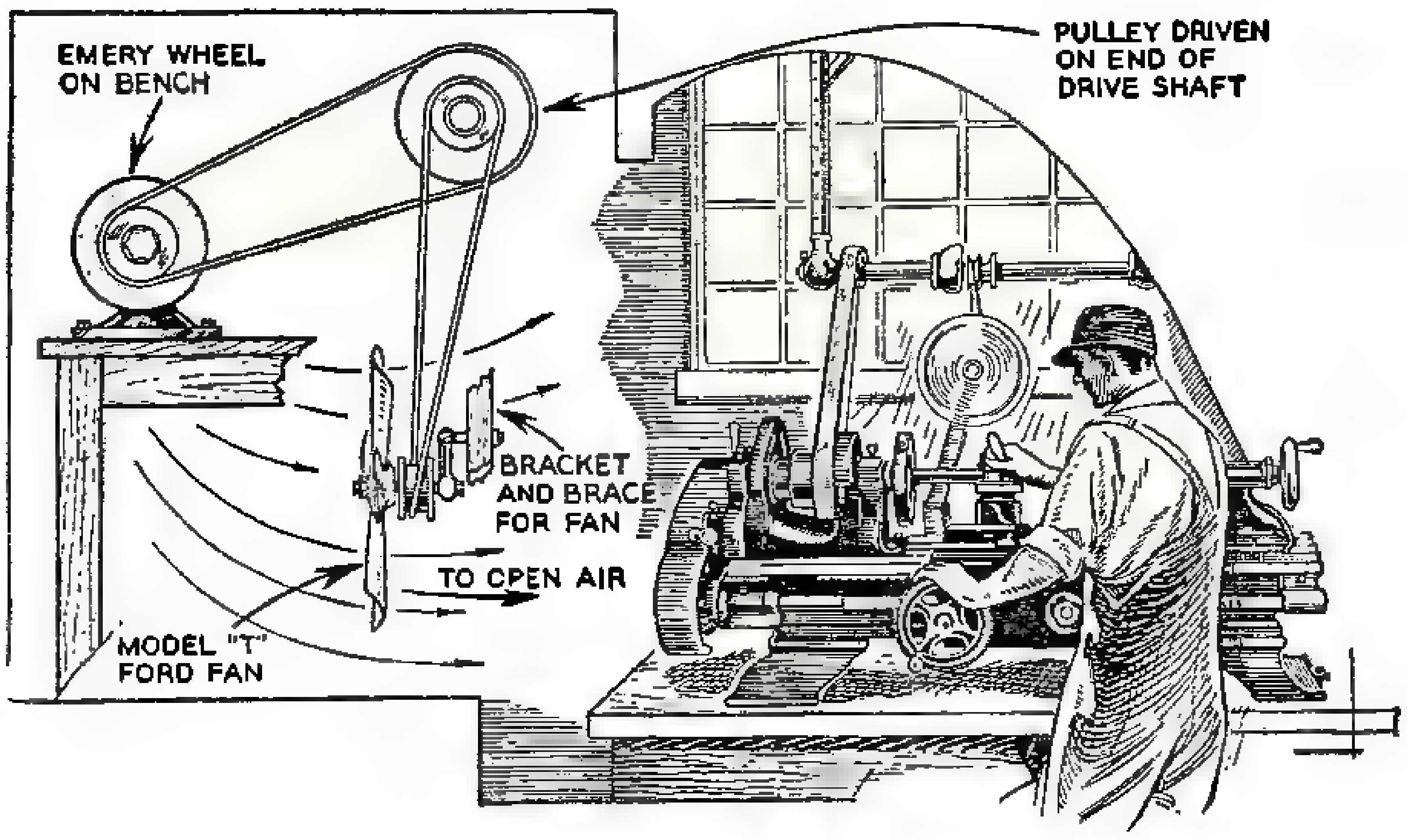
WHEN cooking marmalades, jams, or heavy liquids which require a slow fire for several hours, the danger of scorching may be prevented by the simple expedient of setting the kettle in a tin pan of table salt, as illustrated in the accompanying drawing. This salt serves as a cushion to diffuse the heat and prevent direct contact with the pan. The salt can be used over and over again. One precaution, however: do not use an aluminum pie pan for the job, because it will burn through in a short time.—Hi Sibley.

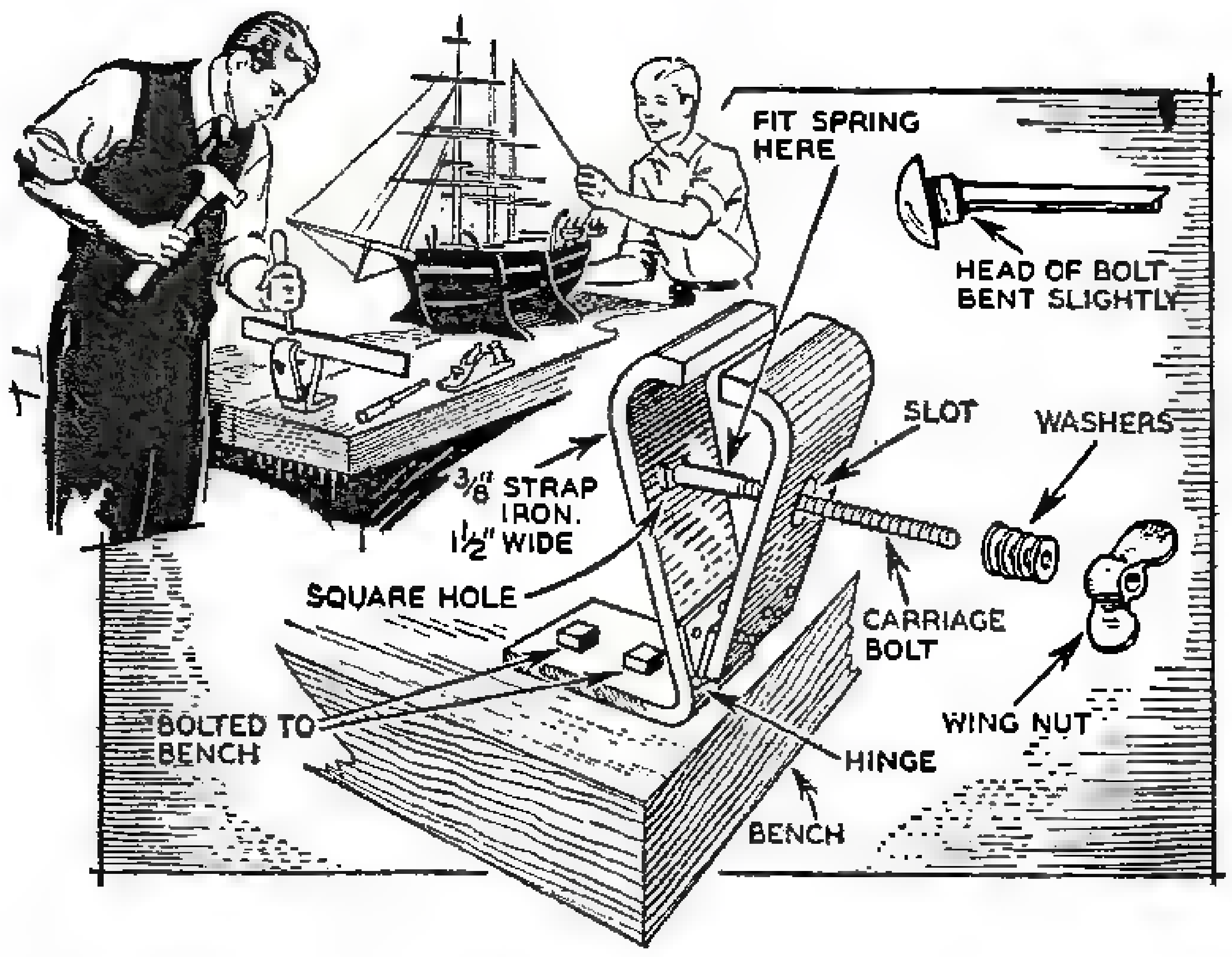

TIN PIE PAN FILLED WITH TABLE SALT

Reducing Labor at the Workbench

Fan Purifies Workshop Air

DUST and mist from paint spray machines or grinders soon shorten the lives of workmen unless simple precautions are taken. For the small workshop, an inexpensive method of clearing the air makes use of a second-hand auto fan which may be picked up at any junk shop. This fan is operated from a pulley driven on the nearest motor drive shaft. The fan efficiently cleans the air by way of a wood or sheet tin air channel leading to the open.—Everett Folger.


EMERY WHEEL ON BENCH
PULLEY DRIVEN ON END OF DRIVE SHAFT
BRACKET AND BRACE FOR FAN
TO OPEN AIR
MODEL "T" FORD FAN

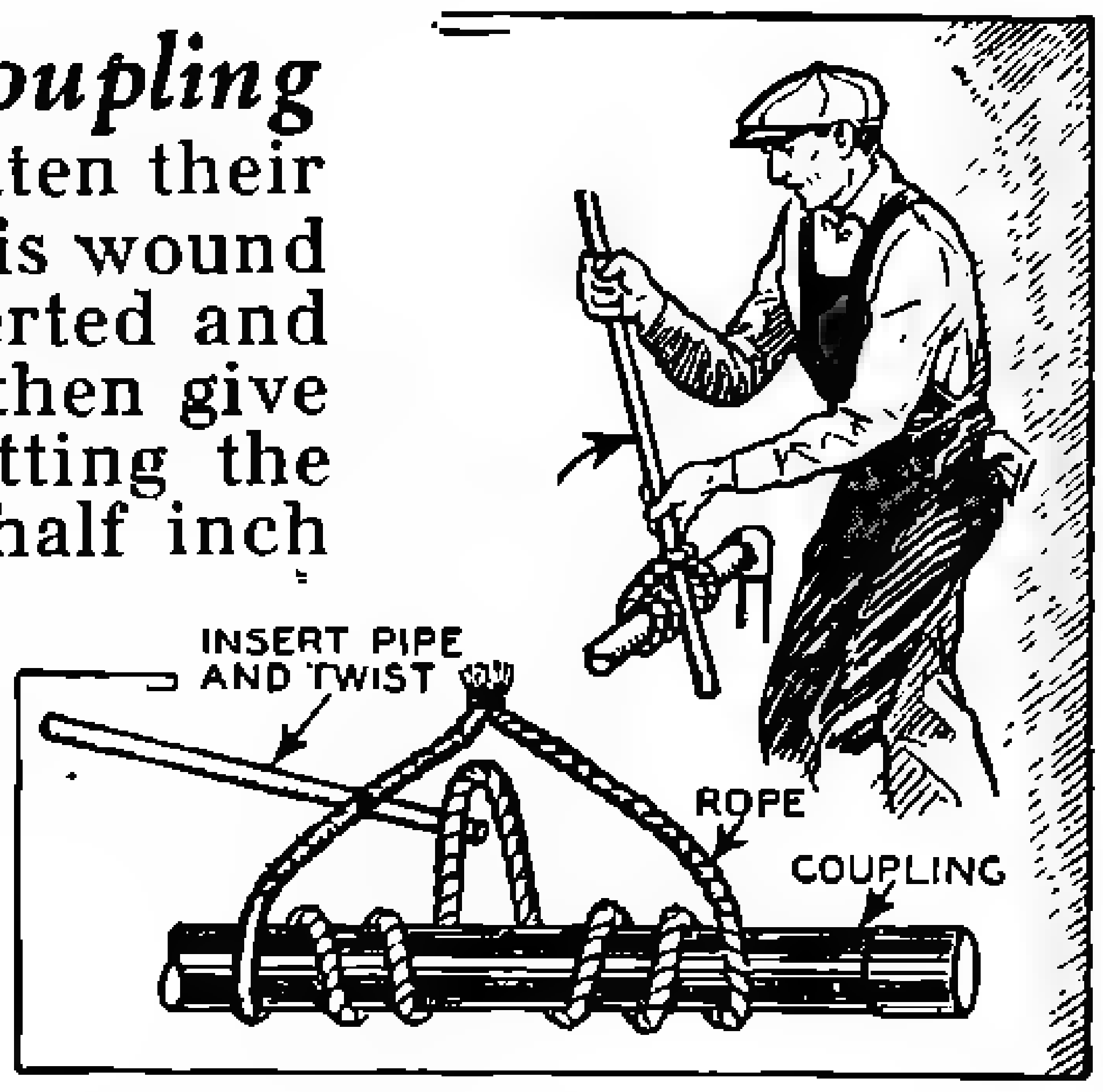

FIT SPRING HERE
HEAD OF BOLT BENT SLIGHTLY
SLOT
WASHERS
⅜" STRAP IRON. 1½" WIDE
SQUARE HOLE
CARRIAGE BOLT
WING NUT
BOLTED TO BENCH
HINGE
BENCH

Small Bench Vise From Strap Iron

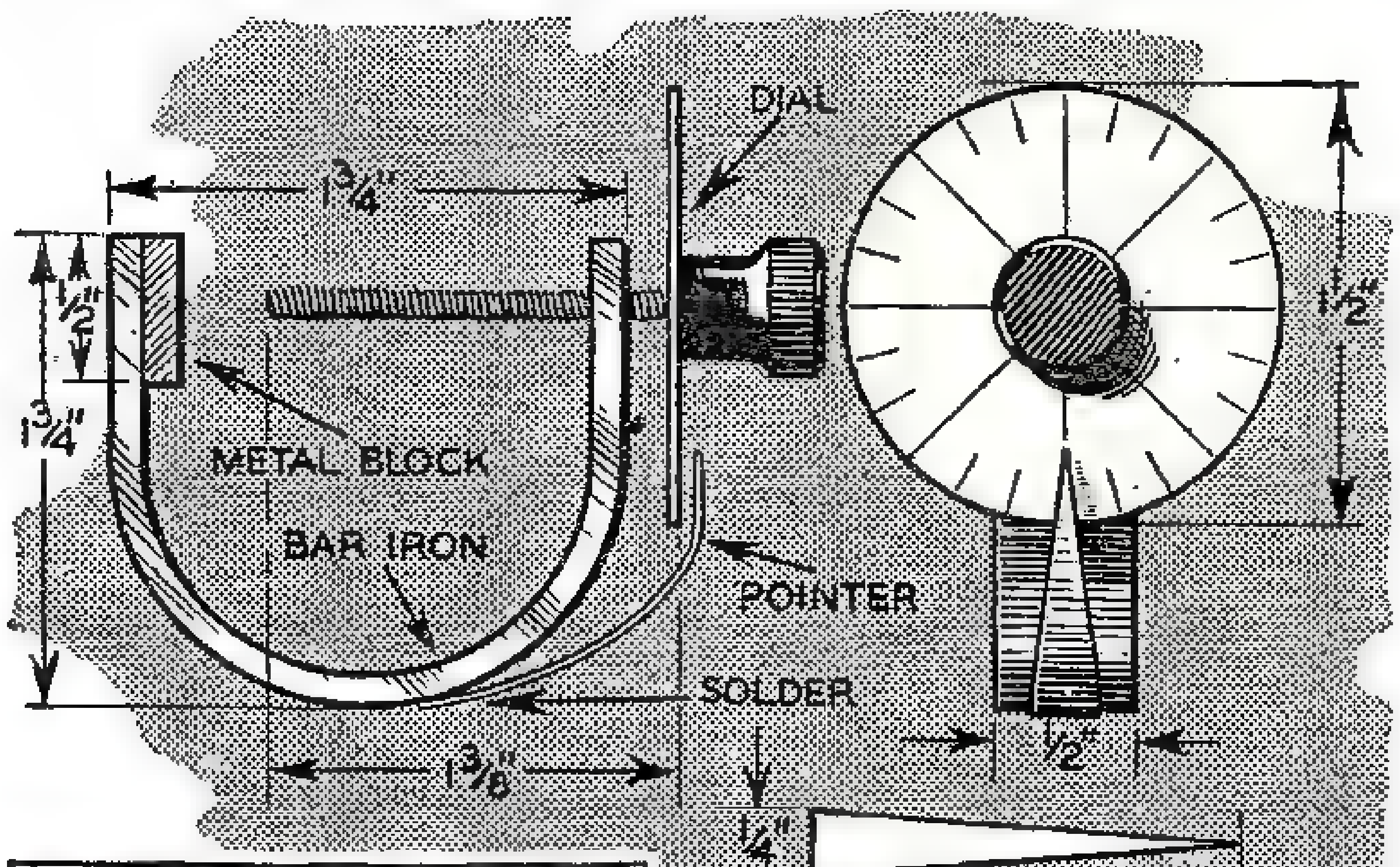
EXCELLENT for handling small work, this tiny bench vise is easy to make. The strap iron pieces should be bent to the shape illustrated at the left and held together with small hinges attached with countersunk rivets. A carriage bolt takes the place of the screw, and tightening the jaws is accomplished by twisting the large-eared wing-nut. To compensate for the angle at which the stationary piece leans, the bolt is bent slightly at the head. If the L by which the vise is bolted to the bench is omitted the device will serve as an excellent work clamp. The device is particularly useful where work with small or delicate units is involved.—Thomas L. Moore.

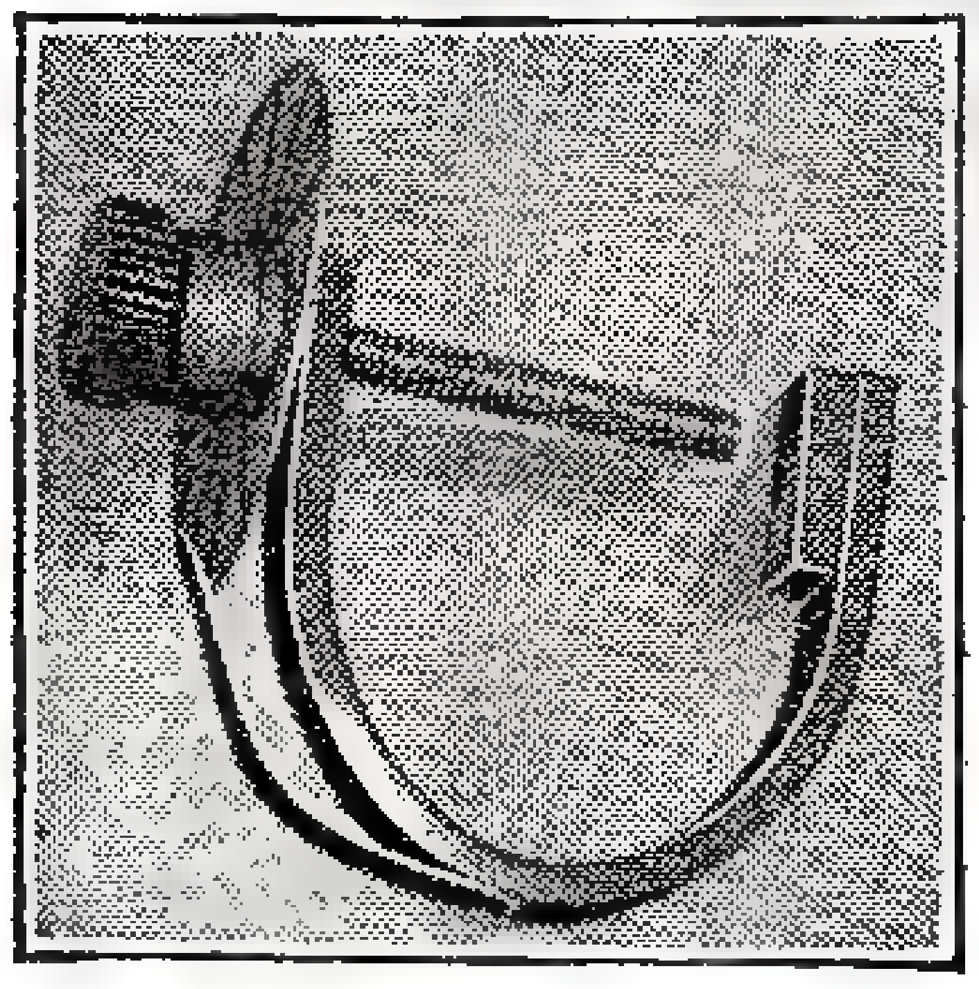
Rope Does Duty as Vise to Remove Pipe Coupling

HERE'S a simple little kink for plumbers who have forgotten their vise. It has to do with removing coupling. First a rope is wound around the coupling as illustrated and then a stick is inserted and twisted. Pull this stick around till the rope grips tightly, then give a firm yank. The coupling will come loose easily. Wetting the rope will increase the firmness of the grip. Good strong half inch manila rope will suffice for the task.—C. J. Marek.


INSERT PIPE AND TWIST
ROPE
COUPLING

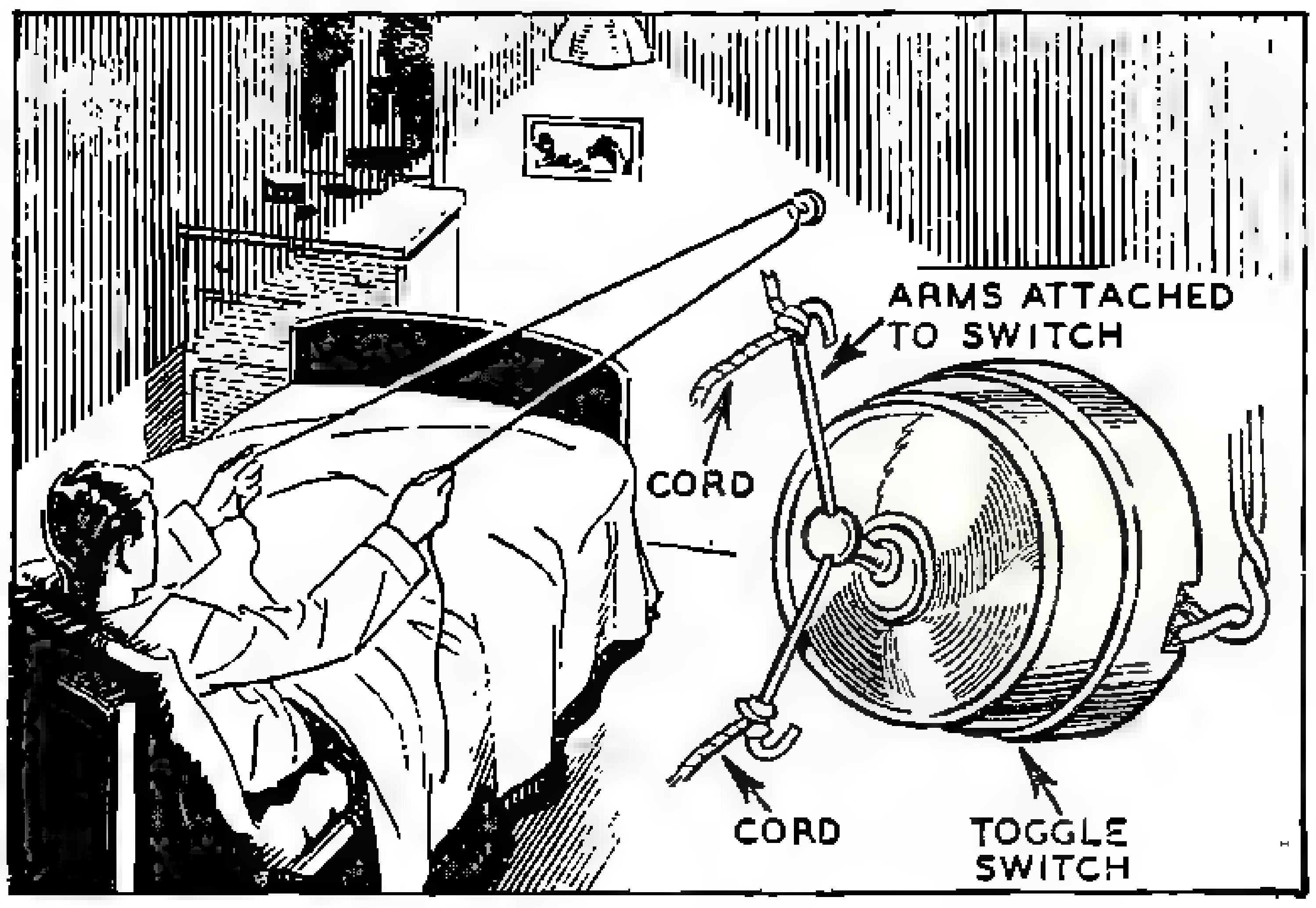
Home-Made Micrometer


DIAL
1¾"
½"
1¾"
METAL BLOCK
BAR IRON
POINTER
SOLDER
1⅜"
1½"
½"
¼"
1½"



THIS is not a substitute for a standard micrometer, but it will, if used carefully, afford some very close measurements. A ⅛"x⅜" bar of brass is used to form a horseshoe of the size shown and another smaller piece of the brass is soldered on the end of the horseshoe to form the anvil. The opposite end of the horseshoe is drilled to take either a 10-32 thread or an 8-32 thread. The thin sheet brass disc is next divided up into sections and soldered to the threaded rod or screw in the position indicated. The pointer completes the job. When the 32 series of threads are used, we simply need to keep in mind the fact that such threads advance one thirty-second, or .030 of an inch every time they are turned once. A half turn would be 1/64th or .015, etc. The gadget will prove surprisingly handy for ordinary use.—Raymond Francis.

Handy Helps for Everyone

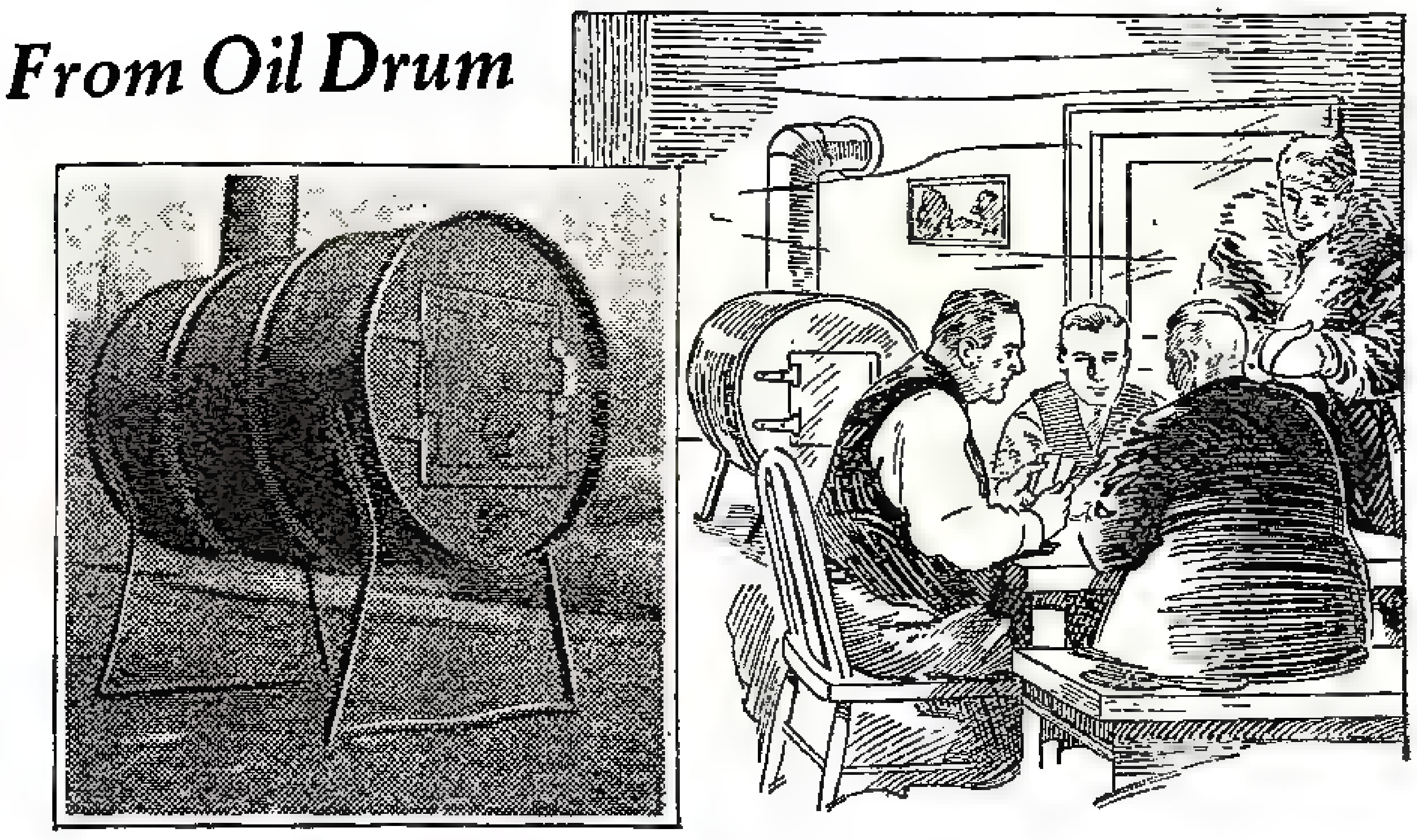


Remote Control Toggle Switch

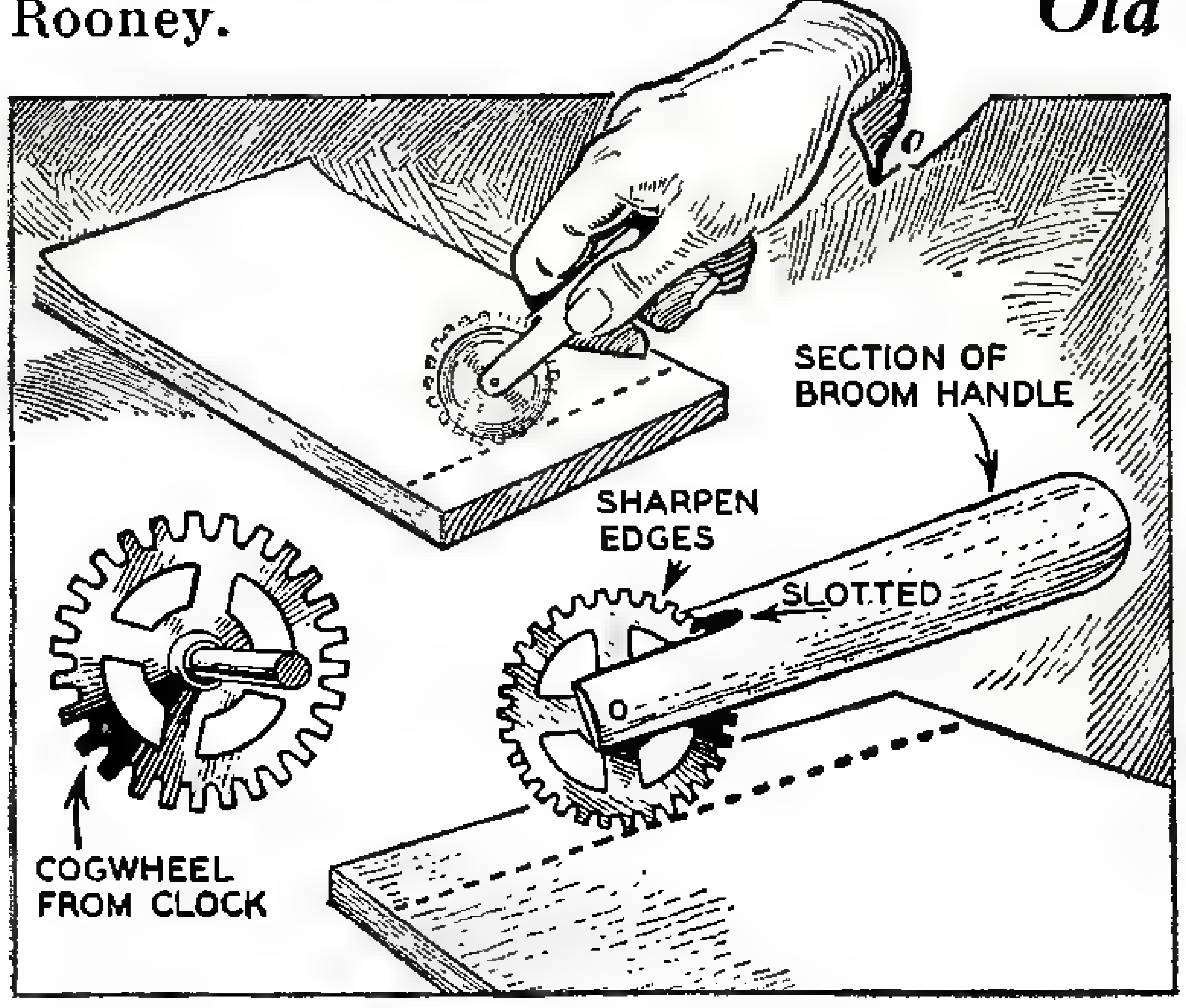
NO NEED at all to get out of bed if you have this pull chain switch easily accessible to your hands. Simply reach up and grab a cord, pull it, and on or off goes the light, just as you wish. How the stunt is worked is illustrated at the left. In the handle of the toggle switch bore a hole to take a ¼-in. steel rod, bent at right angles, as shown. To the ends of this rod attach a pair of cords leading to the head of your bed. They can be passed through a pair of screweyes if the switch is in an awkward position.—V. E. Barnes.

Keep Warm With Stove Made From Oil Drum

A SURPRISINGLY practical and sturdy stove can be made from an ordinary oil or alcohol drum, as illustrated in the accompanying drawing. The legs may be made from heavy strap iron, which is bolted onto drum. To make the door, simply cut out a section about 14x14, attach a pair of hinges to one edge, reinforce it with tin, then bolt back in the position shown. In the top cut a 6-inch hole and solder around it a piece of tin to take the chimney pipe. An old bike bell makes the draft on the door.—Thos. Rooney.



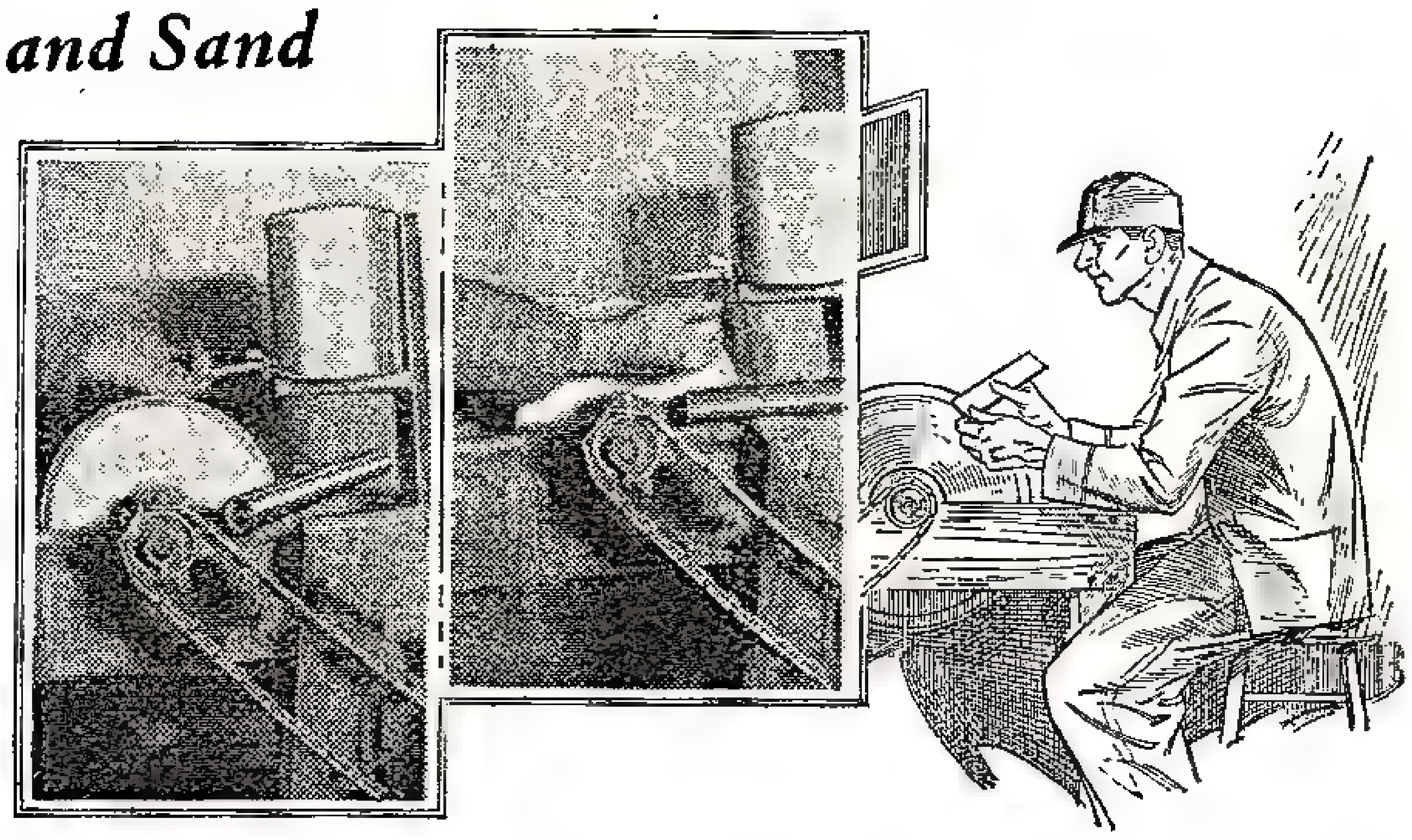
Old Clock Wheel Makes Paper Perforator



NEED a gadget to perforate pages or sheets of paper that have to be torn along an even line? If so, this little gadget will do the trick. The cutter is a cog wheel taken from an old clock movement. The edge should be ground lightly till it is plenty sharp. For a handle, cut off a section of broomhandle about six inches long, and slot it in the end about two inches deep. The wheel fits in this incision. Perforation is performed as illustrated in the drawing. With a good cutting edge on the wheel the sheet should tear evenly and easily. Apply just as heavy pressure as you can without bending the wheel. It will probably be necessary to file down the clock teeth to sharp points in order to provide sufficient of a cutting edge. —A. H. Waychoff.

True Up Grindstone With Pipe and Sand

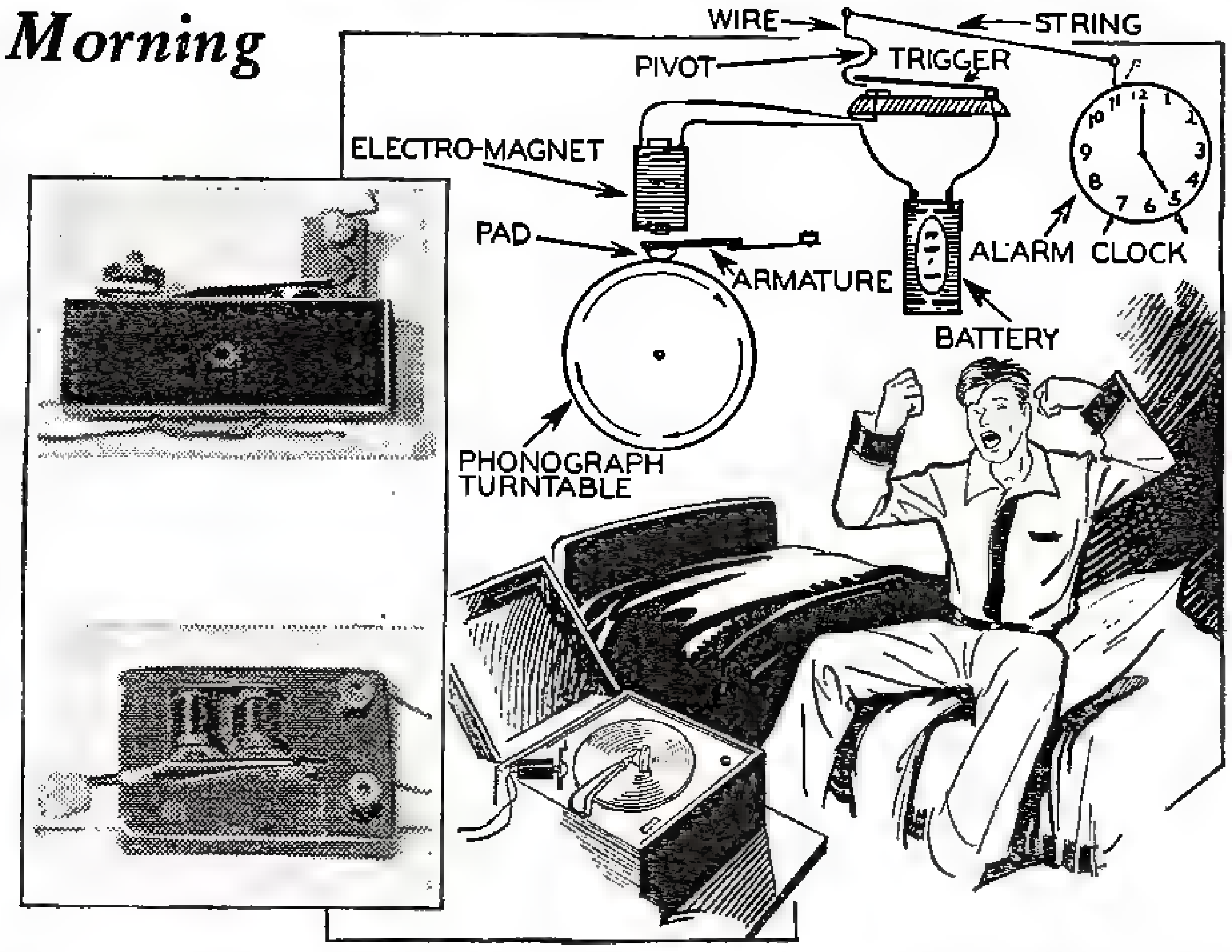
THE most effective way to true up your shop grindstone is with a pipe and fine sand as illustrated at the right. Bolt a piece of pipe to the frame of the stone. Then feed the sand by hand and tap the pipe up close as the stone cuts away. If your stone is very much out of true the bumps can be cut down quickly with an emery wheel dresser, using no water. Use water copiously with the sand, however. For a square face clamp the pipe crosswise.—E. Dorris.



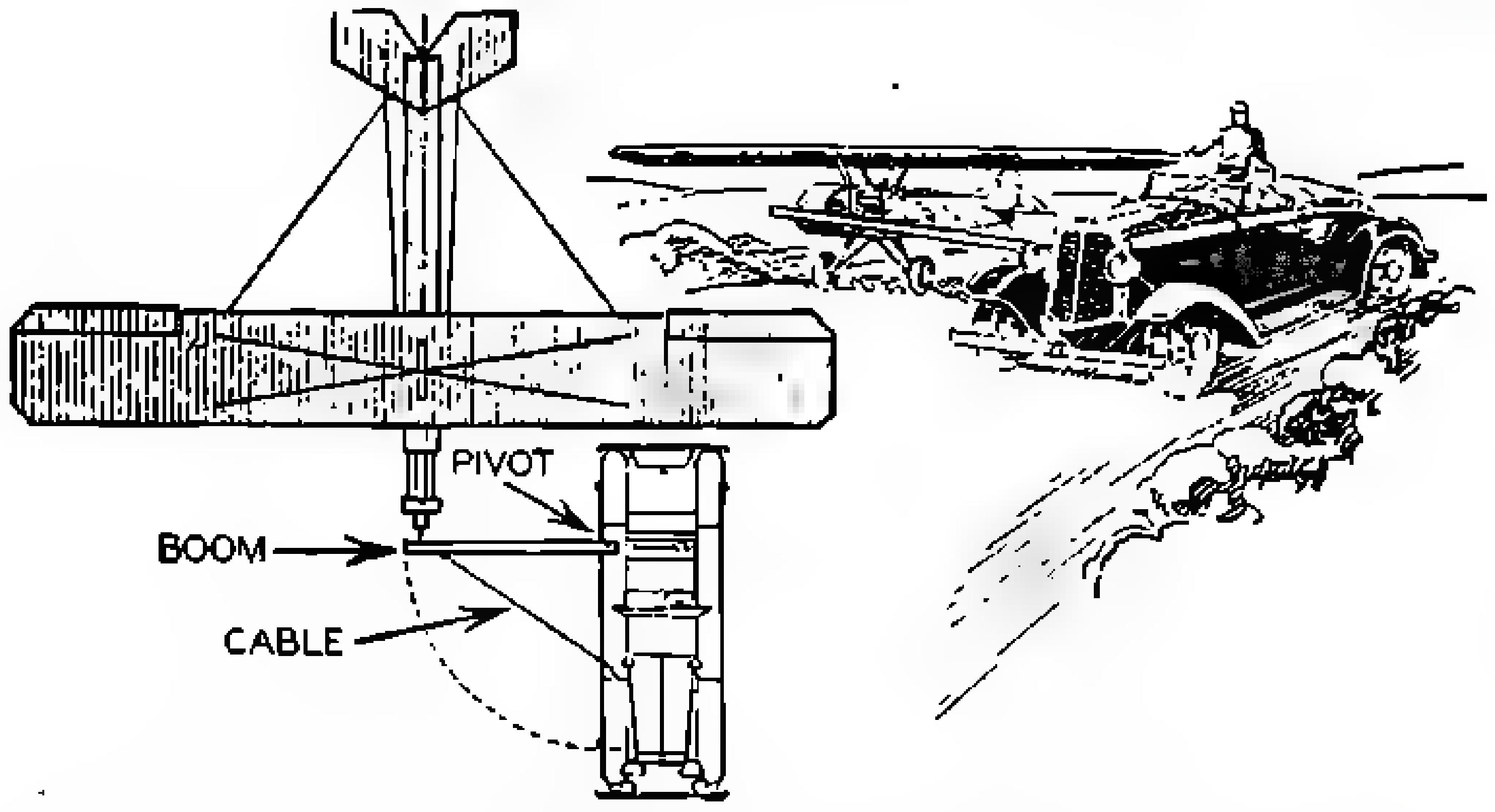
Easier Ways To Do Simple Jobs

Favorite Tune Rouses You in Morning

GETTING out of bed in the morning is a painless task if you are awakened by strains of your favorite tune, set to going on the phonograph by this little automatic switch. The trigger, made as illustrated in the accompanying drawing, is attached to the bell of the alarm clock, so that when the alarm goes off juice to the electromagnet is turned on. This latter part, taken from an old doorbell, has a pad on the bell clapper which presses against the turntable, setting it in motion when the armature is drawn back. Before you go to bed, you should wind up the phonograph, put on the record, and set the trigger.—J. Vartalied.



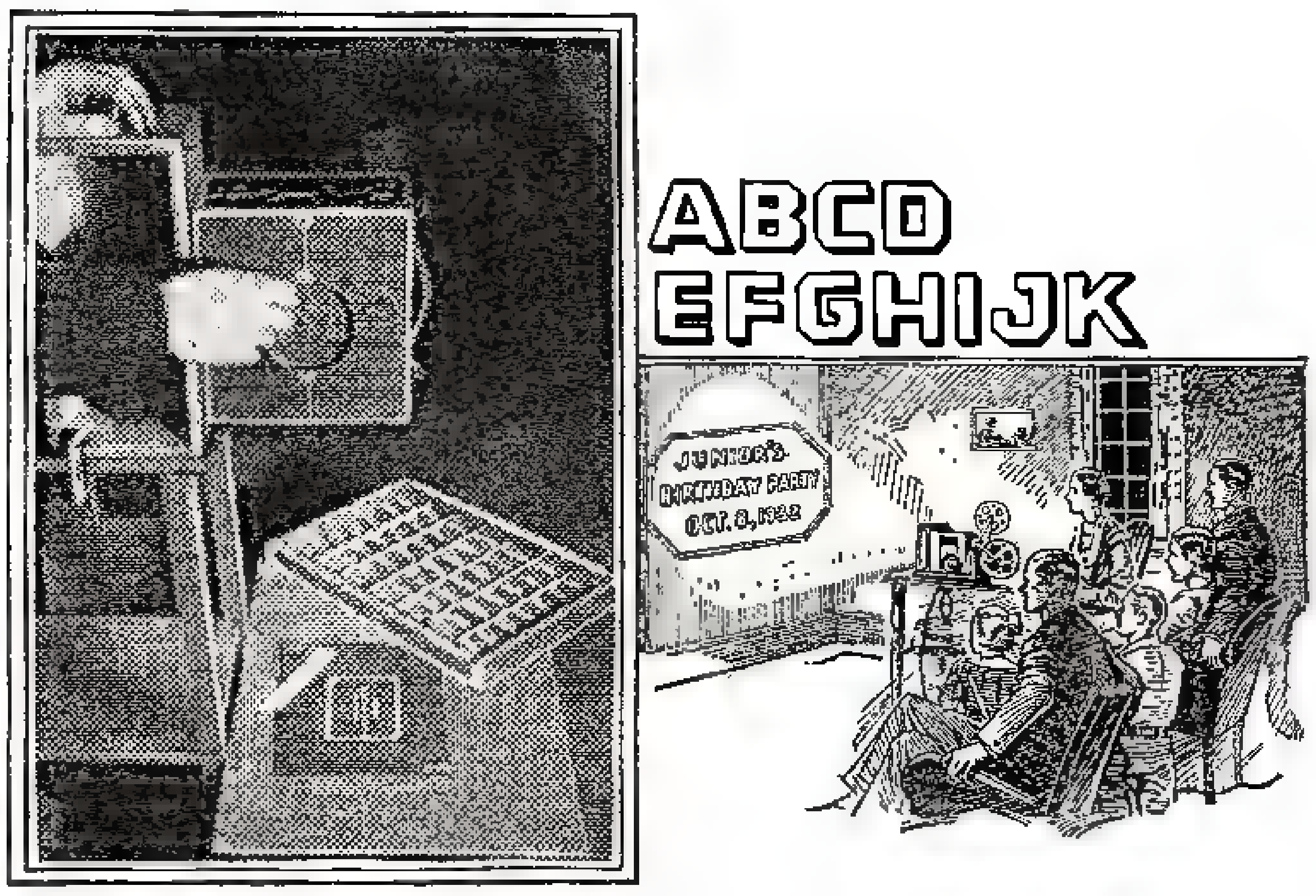
Outrigger on Side of Auto Tows Your Glider Back to Point of Take-off

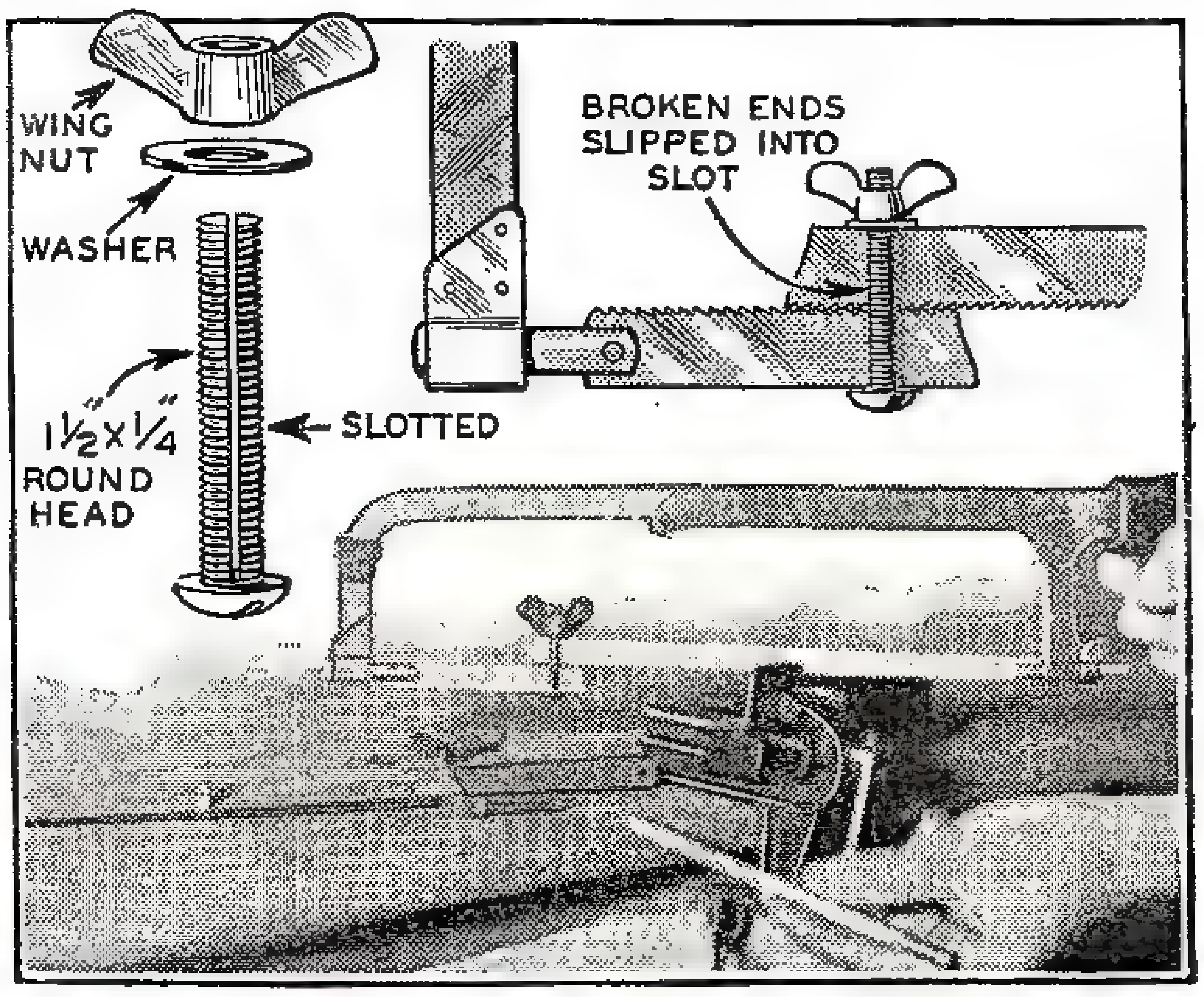


TOWING your glider back to its starting point is unnecessary, for you can make your auto do the pulling. Simply attach a boom to the side of the car, as illustrated at the left, and hook the glider onto it and tow away. A cable from the front of the auto to the end of the boom holds the boom in position. One precaution: when you are towing, don't hit up a too high speed, otherwise the glider might take off for a short flight and come down on its nose.—Albert Hawver.

Making Titles for Home Movies

A FONT of letters for use in making amateur movie titles can be made from a package of alphabet soup noodles. A piece of black paper over which is pasted a suitable border makes a nice contrasty background for the titles. The illustration at the right shows a simple and convenient method of clamping the camera over the edge of the table directly over the title board. If a hand operated camera is used two turns of the crank for each word used in the title will give the right amount of reading time. With spring motor type, one second of running time per word is sufficient.—Bruce Sifford.

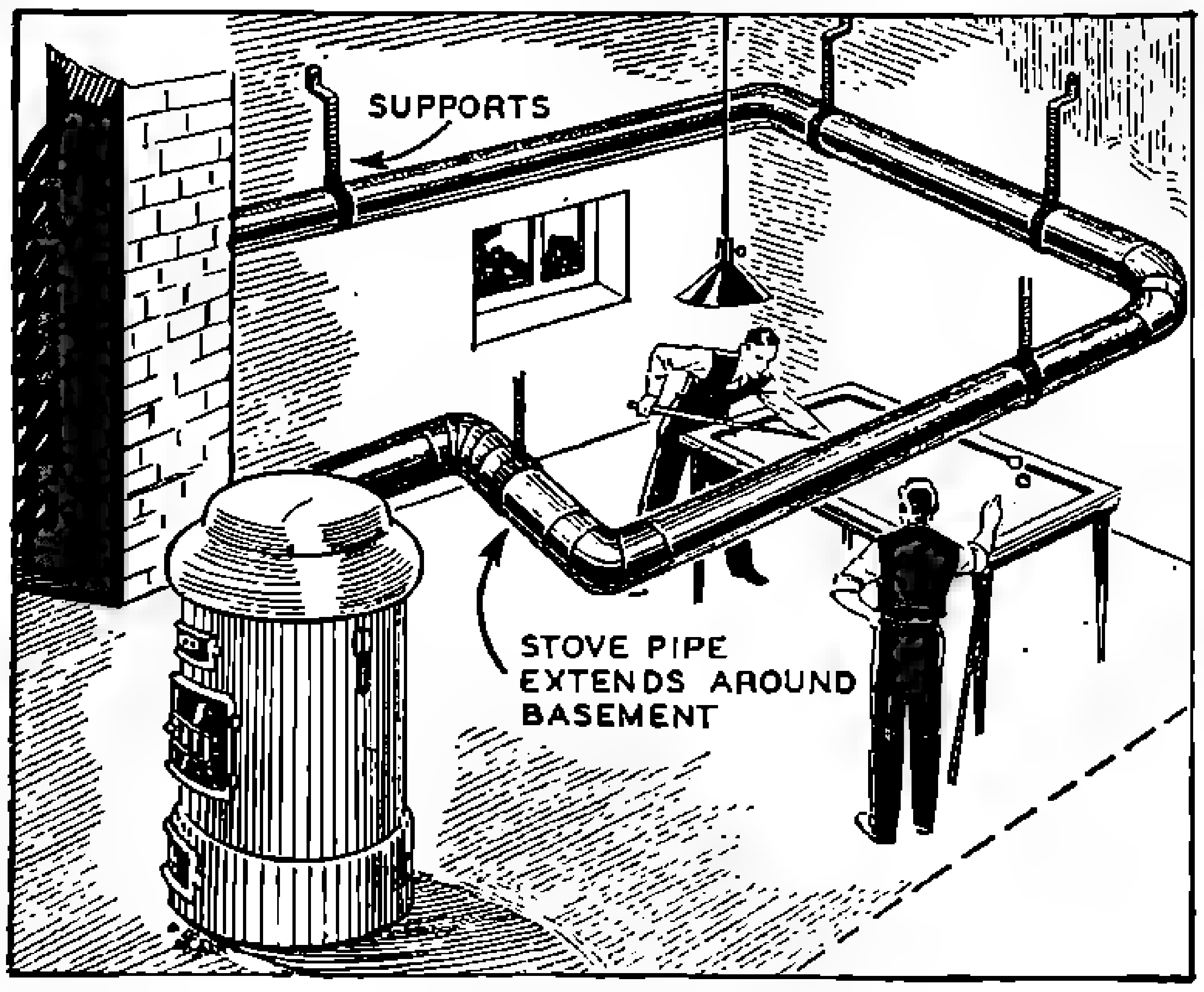




Repairing Broken Hack Saw Blade

BROKEN hack saw blades which still have a good bite to them can be mended with the little stunt illustrated in the drawing at the left, which makes use of a round head bolt, a washer and a wing nut. The bolt should be slotted down the center of its shaft and slipped into position as illustrated. Then the washer is slipped in place and finally the wing nut, which is wound down till the teeth mesh. Make one or two of these gadgets and keep them handy in your tool box for emergency use. They'll come in handy when you're out of blades. When you have a bolt available you can get a lot more use out of a new blade that has just snapped.—Little Handy Andy.

Ideas That Save Time and Money

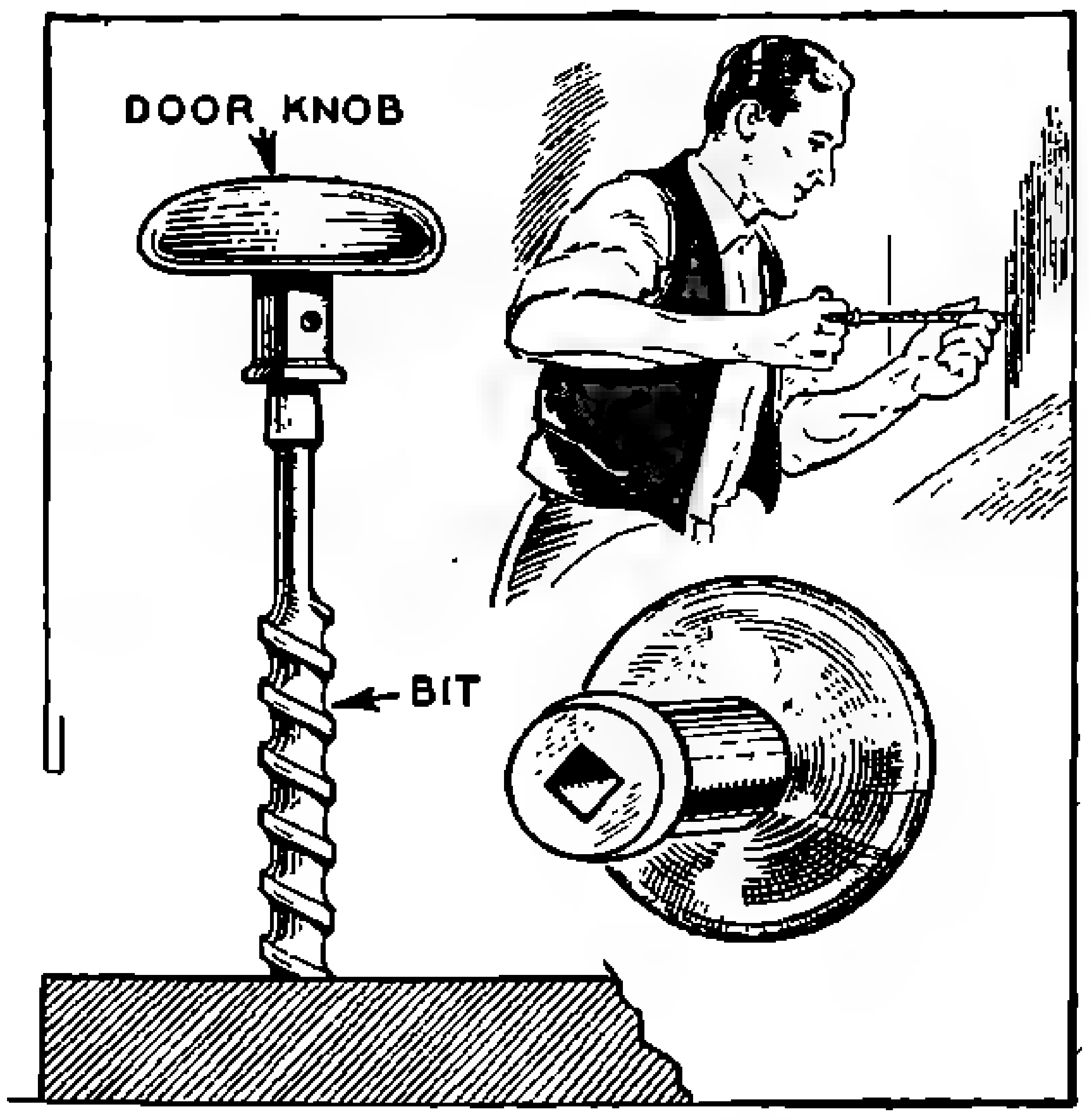

SUPPORTS
STOVE PIPE EXTENDS AROUND BASEMENT

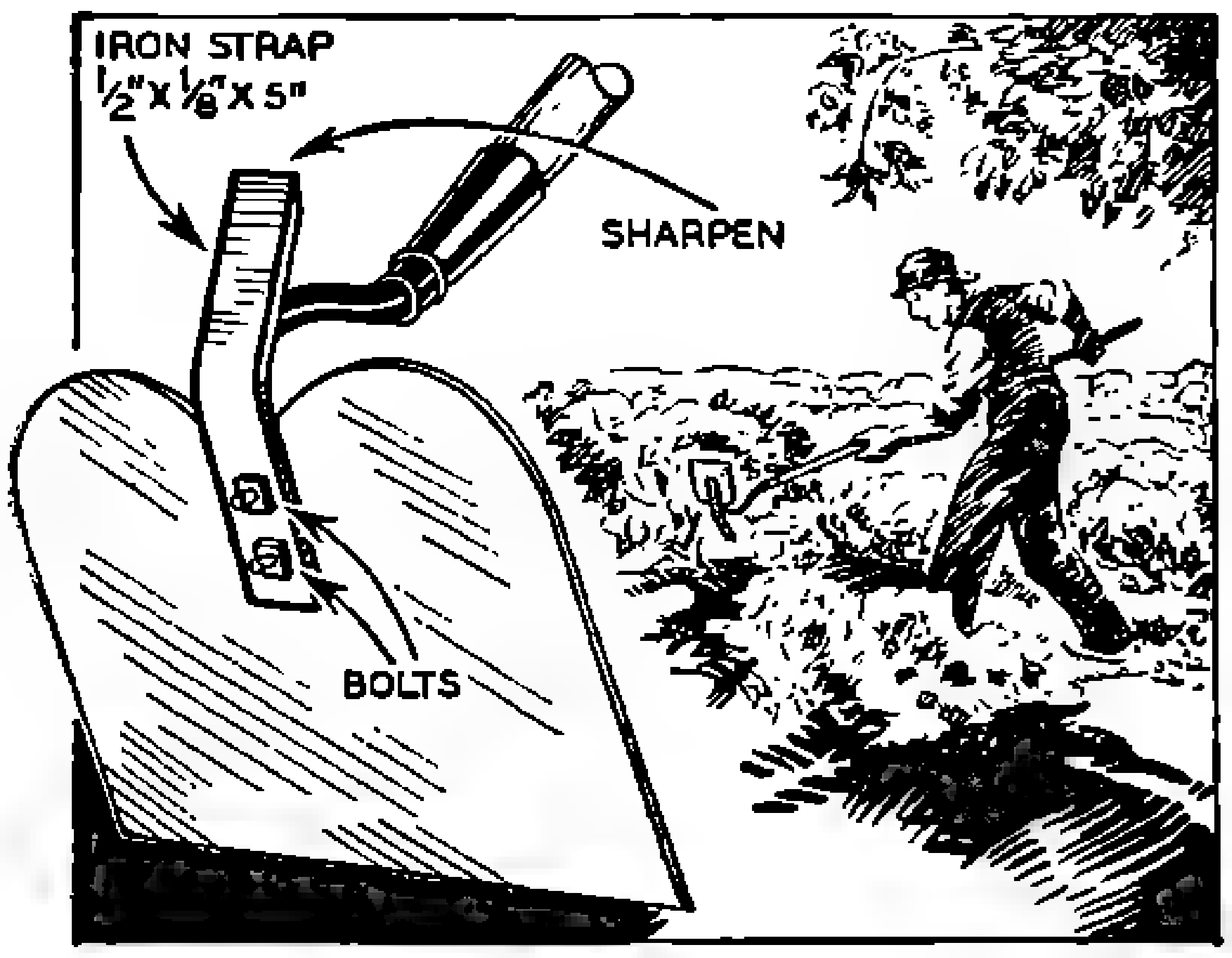
Heat Basement Without Fuel Cost

BASEMENTS can be heated without any additional fuel cost if the pipes leading from the furnace to the chimney are arranged around the room in the manner shown in the accompanying drawing. The pipes will be kept quite hot by heat which otherwise would be wasted up the chimney. The same idea can be extended to an ordinary coal stove to obtain the greatest amount of heat from a minimum of fuel. In effect, the pipes, which are of course uninsulated, act as radiators. A garage can be similarly heated.—William Tatina.

Door Knob Used as Bit Brace for Close Fit

WHEN a hole must be bored in a space too small to admit an ordinary bit brace, which requires considerable elbow room for manipulation, an ordinary porcelain door knob can be used as a substitute. The knob has a square hole in its shaft which fits perfectly the tapering shank of the bit, and by simply turning the knob a hole can be bored as shown in the drawing.—George P. Ford.



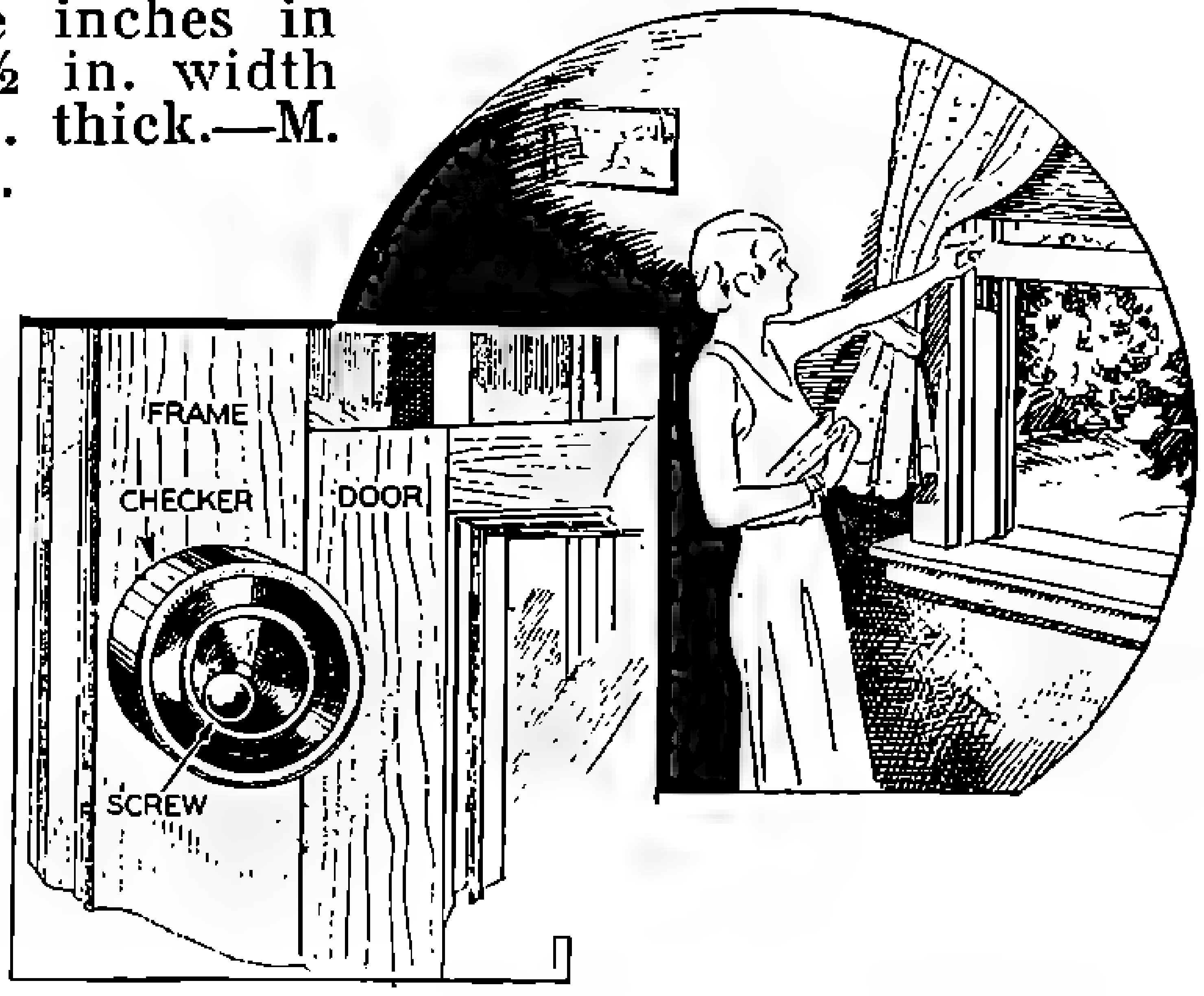


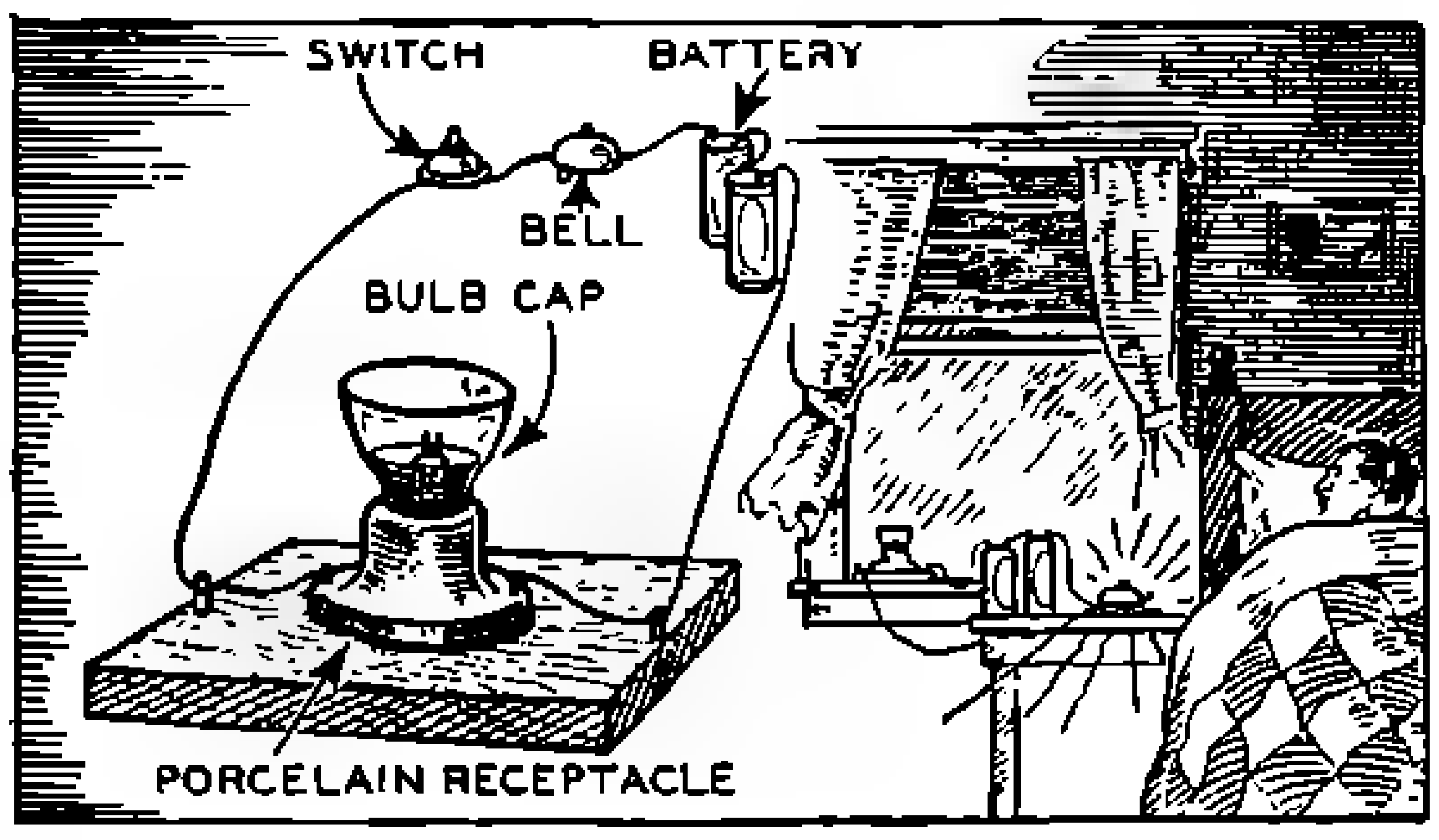
Extra Hoe Blade

FOR hoeing between plants which are so close together that the large blade cannot be used, an auxiliary blade made from a piece of stiff iron or steel and bolted onto the hoe with two stove bolts, as shown in the drawing, will prove very useful. It can also be used for making rows when seeding. It is slightly bent, as illustrated, and dimensions are about five inches in length, 1½ in. width and ⅛ in. thick.—M. Winterton.

Window Lock Made From Checker

WHEN a window or similar vertical sliding panel or door will not stick in position when raised, but begins to slip, the simple checker lock shown at the right will come in handy. Drill a hole through the checker about three-sixteenths inch off center and insert a screw for attachment to the jamb. When the checker is pressed against window it is effectively locked in place. Release is effected by turning the eccentrically mounted checker in the other direction.—J. Marinac.





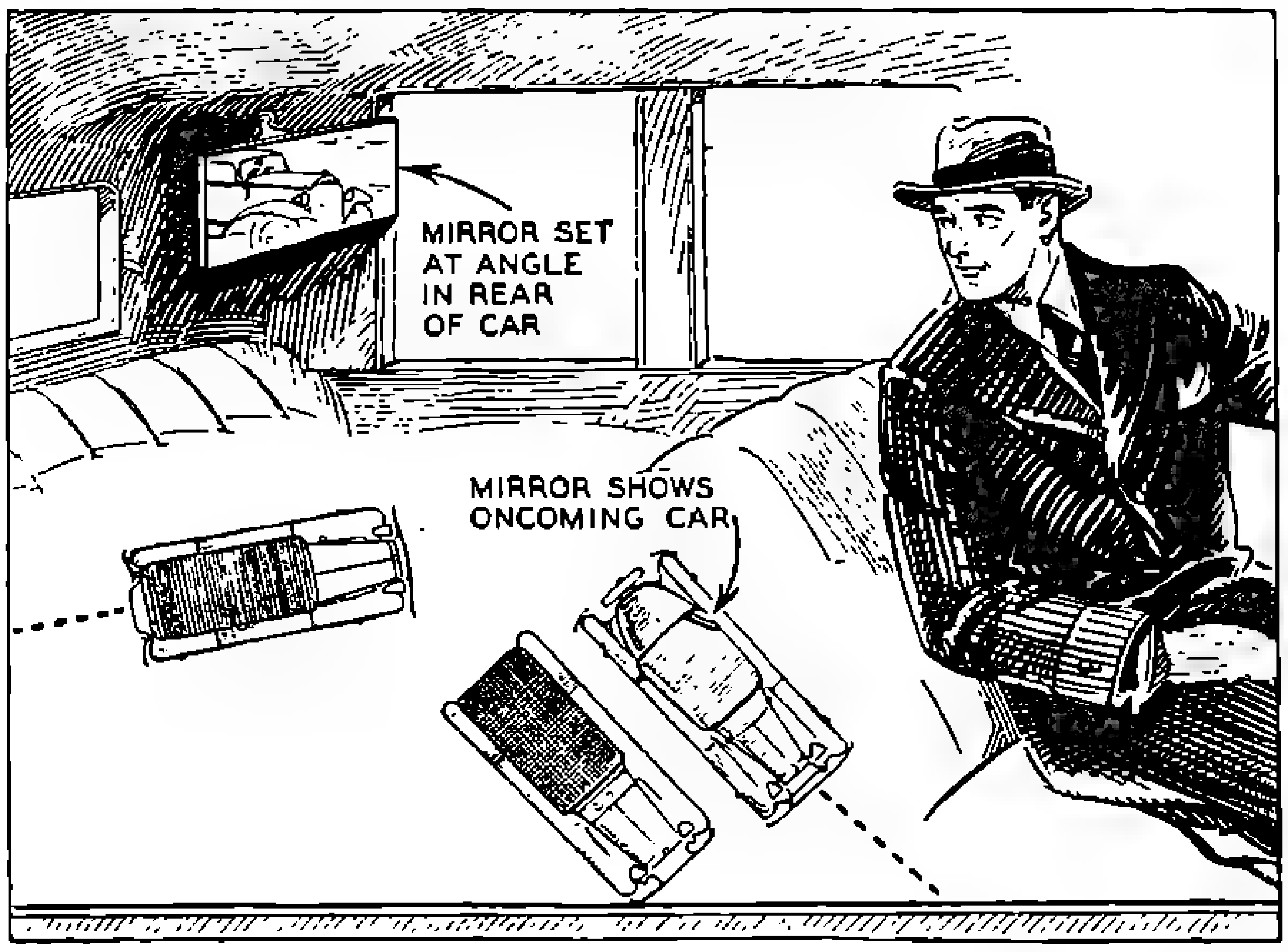
Rain Warning Signal Made From Bulb

FOR those who wish to know at night the instant it starts to rain, the device shown at the left will be helpful. A filament electric bulb is cut off into cup-like shape and mounted as shown. Diluted sulphuric acid is poured into the cup, bringing it almost to the level of the two platinum tips in the bulb base. When a few drops of rain fall, the level of the liquid will be raised, a connection made, and the bell sounded.—J. J. Brixius.

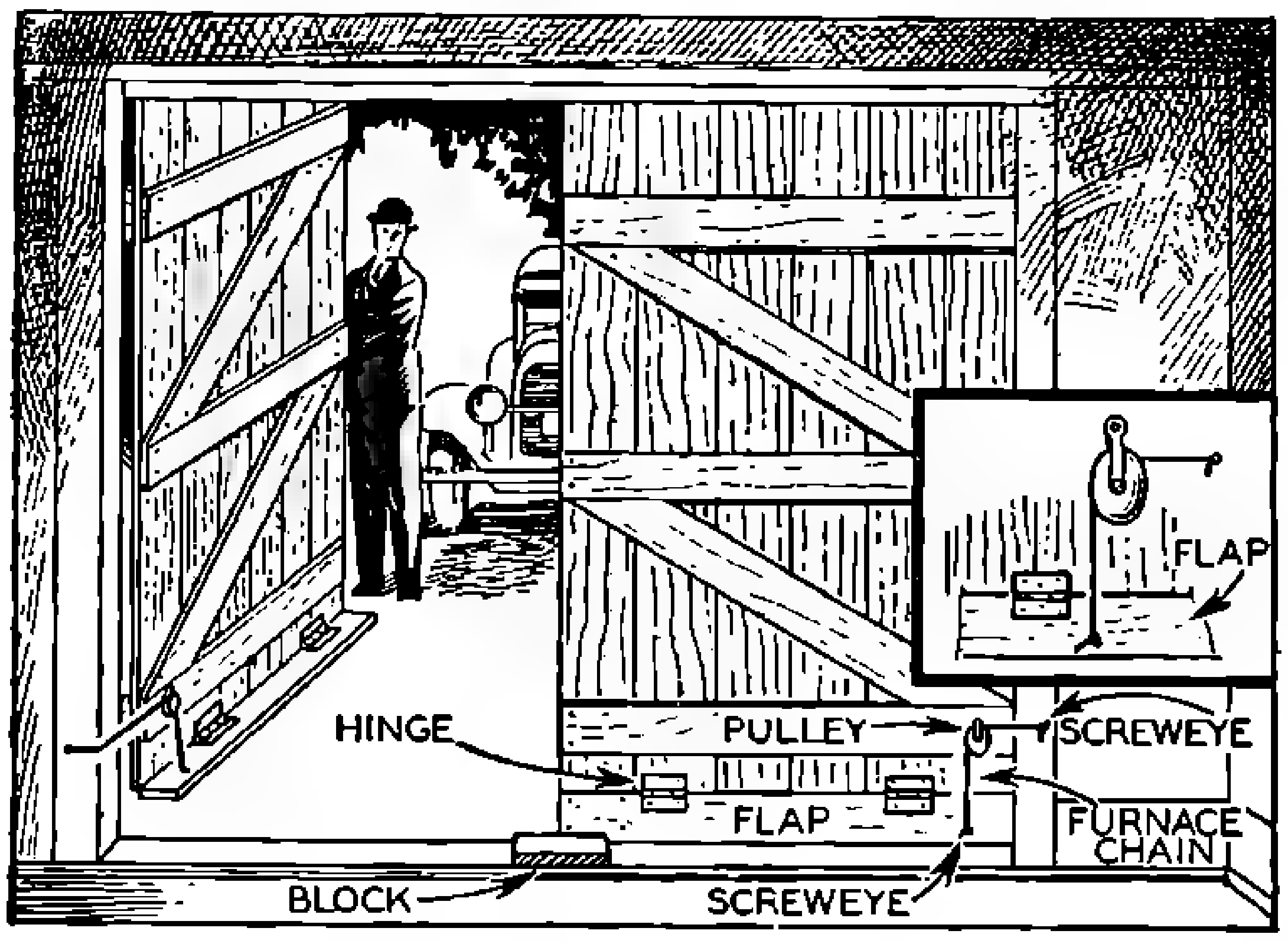
Kinks of Interest to Motorists

Angle Mirror for Your Auto

IF YOU are angle-parked alongside a truck and wish to back out into the street, you can do so only by being extremely cautious in your progress, owing to the impossibility of seeing around the truck into the approaching line of traffic. The ordinary rear-vision mirror is useless in such an instance, but if a mirror be set in place at an angle in the rear quarter of the car, as shown in the drawing, approaching vehicles can be plainly seen. It is recommended that the mirror be at least one foot long, and set at such an angle that it can be watched from the front mirror.—Douglas Vreeden.


MIRROR SET AT ANGLE IN REAR OF CAR
MIRROR SHOWS ONCOMING CAR

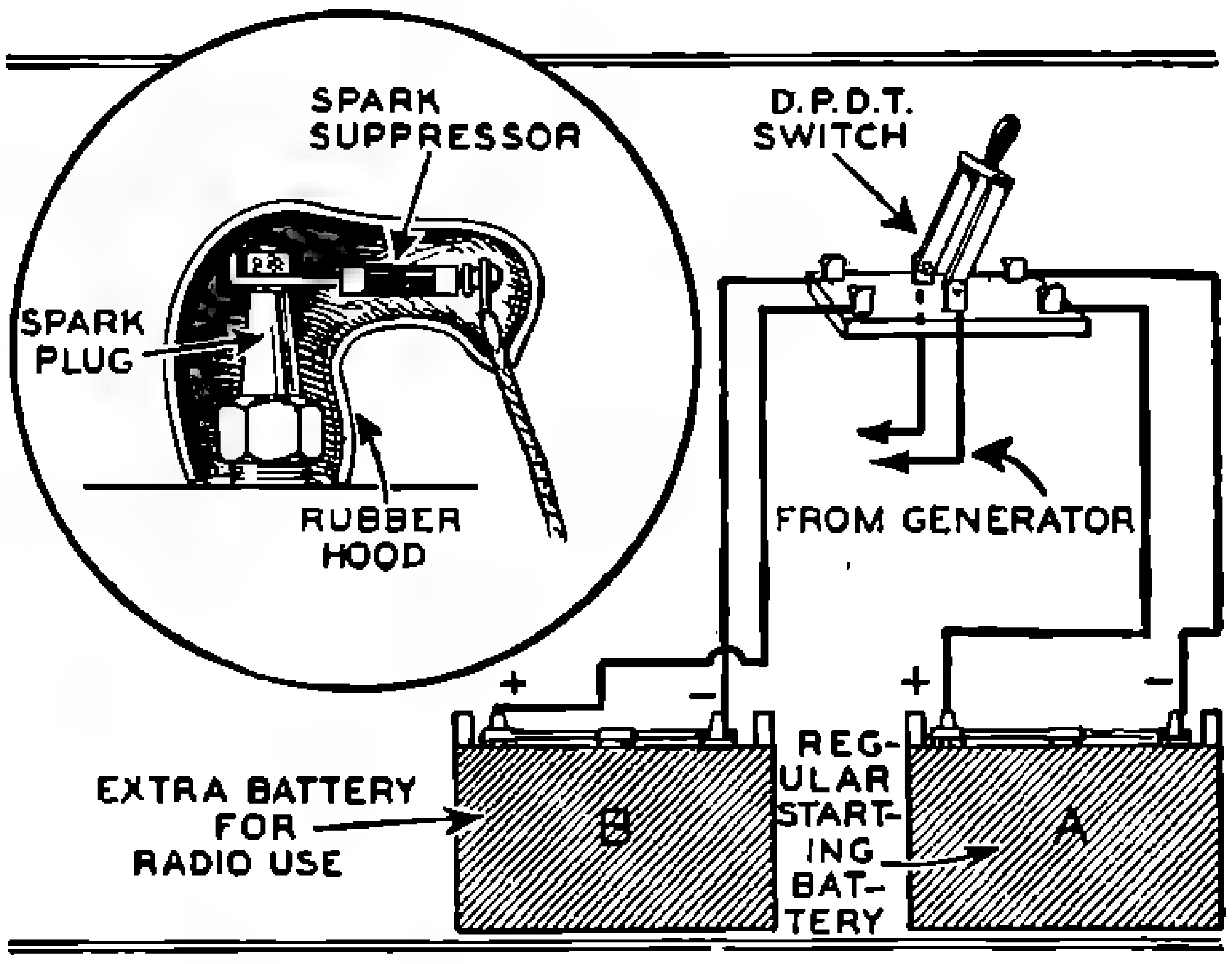
Automatic Flaps Close Up the Space Beneath Loose Fitting Garage Doors


FLAP
HINGE
PULLEY
SCREWEYE
FLAP
FURNACE CHAIN
BLOCK
SCREWEYE

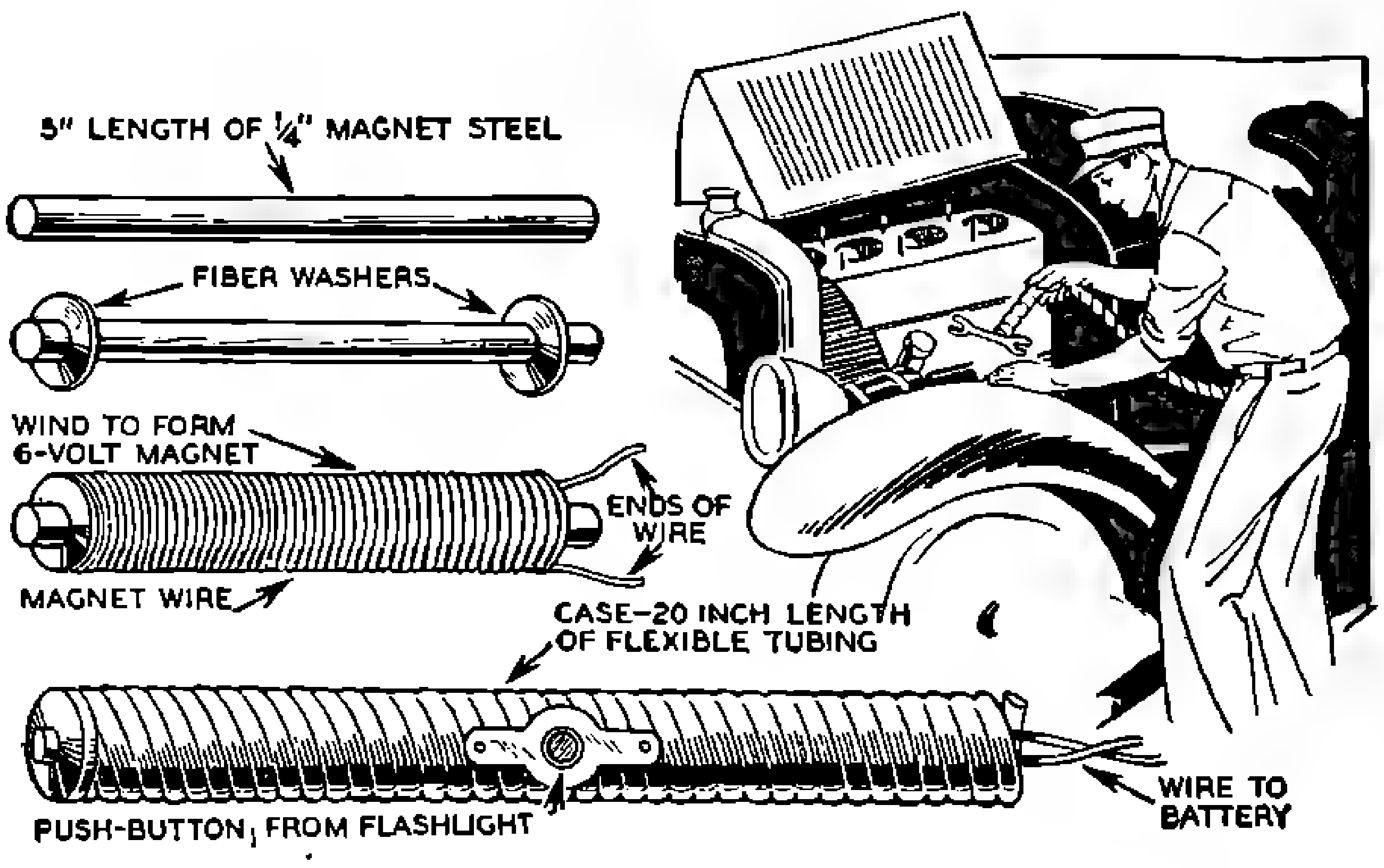
WHEN garage doors are loosely fitted, as is sometimes the case when old buildings are used for housing the car, there is frequently an objectionable open space between the bottoms of the doors and the floor. Folding flaps which rise or lower as the door is opened or closed, excluding cold air, snow, leaves, and small animals from the garage, can be constructed from the diagram given at the left.—Vance Bell.

Eliminating Noises in Auto Radio

TROUBLED with induction in your automobile radio? Here's how to get rid of it. First remove all the leads from the sparkplugs and connect in the spark suppressors as illustrated in the drawing. These suppressors can be obtained at any radio shop. Then cover the entire plug with a rubber hood. This should eliminate the induction noises. Charging your radio battery en route may be accomplished with the circuit employing the D.P.D.T. switch.—Thornton Hallett.


SPARK SUPPRESSOR
SPARK PLUG
RUBBER HOOD
D.P.D.T. SWITCH
FROM GENERATOR
+
-
+
-
EXTRA BATTERY FOR RADIO USE
B
REGULAR STARTING BATTERY
A

Flexible Magnetic Fishing Tool


5" LENGTH OF ¼" MAGNET STEEL
FIBER WASHERS
WIND TO FORM 6-VOLT MAGNET
ENDS OF WIRE
MAGNET WIRE
CASE—20 INCH LENGTH OF FLEXIBLE TUBING
PUSH-BUTTON, FROM FLASHLIGHT
WIRE TO BATTERY

WHEN tools, nuts, screws, etc., drop into inaccessible places, their recovery is often difficult. The writer had his share of this sort of trouble until he rigged up the magnetic "fisher" shown at the left. A five inch length of steel is wound as a 6-volt magnet and soldered into the end of a 20-inch length of flexible brass tubing. Wires pass through the tube to a push-button switch, with spring clamps for attaching to any 6-volt battery. When the juice is switched on, the magnet will pick up steel objects weighing up to a pound.—John Edwin Hogg.

Building the CABINETTE

Here is the trailer for the man who wants to see the country comfortably in a mobile home of his own. It can be built for around $50, according to locality, and will prove a satisfactory place to live on a country-wide tour.

THIS cruise trailer was designed to do but one thing, and to do that thing well: furnish a *comfortable* traveling accessory to the modern tourist in which he could live.

There is room enough for four bunks, although only two have been shown. There is a water closet, and a sludge tank for dishwater and sewage can be installed under the house for use when parked in some place too pretty to despoil; there is an adequate galley or kitchen containing a sink with running water; there is a pantry for the storage of food; there is a bureau for nick nacks.

Every function of living has been accommodated simply, yet adequately. One can live, sleep, eat aboard this cruising trailer, and carry his home with him wherever he goes.

The factor on which the whole design hinges is the chassis. We use an old Model T Ford chassis as they are the easiest of all old auto frames to procure, and as well are notoriously long lived and free from wheel trouble. Also the tires are dirt cheap.

The best way to work is from the ground up, and the first thing to tackle is the conversion of the trailer.

The building of the body or cab is simple as we have designed it, but the matter of underslinging a Ford chassis is a horse from another stable, and therefore let's go into this most important end thoroughly.

As shown in Fig. 7, top, the Ford channel frame is 23 inches wide. It is four inches higher at the rear than at the front. Also the frame proper is way up in the air, far too high to allow us to put on a cab body with nearly full 6-ft. headroom unless we lower it.

Make strap spring shackles for the rear end as the drawings show. Any blacksmith can do this for you for very little money if you don't have the facilities yourself.

The idea here is to get the shackle long enough to let the whole frame down so it is level. The wheels are mounted into the

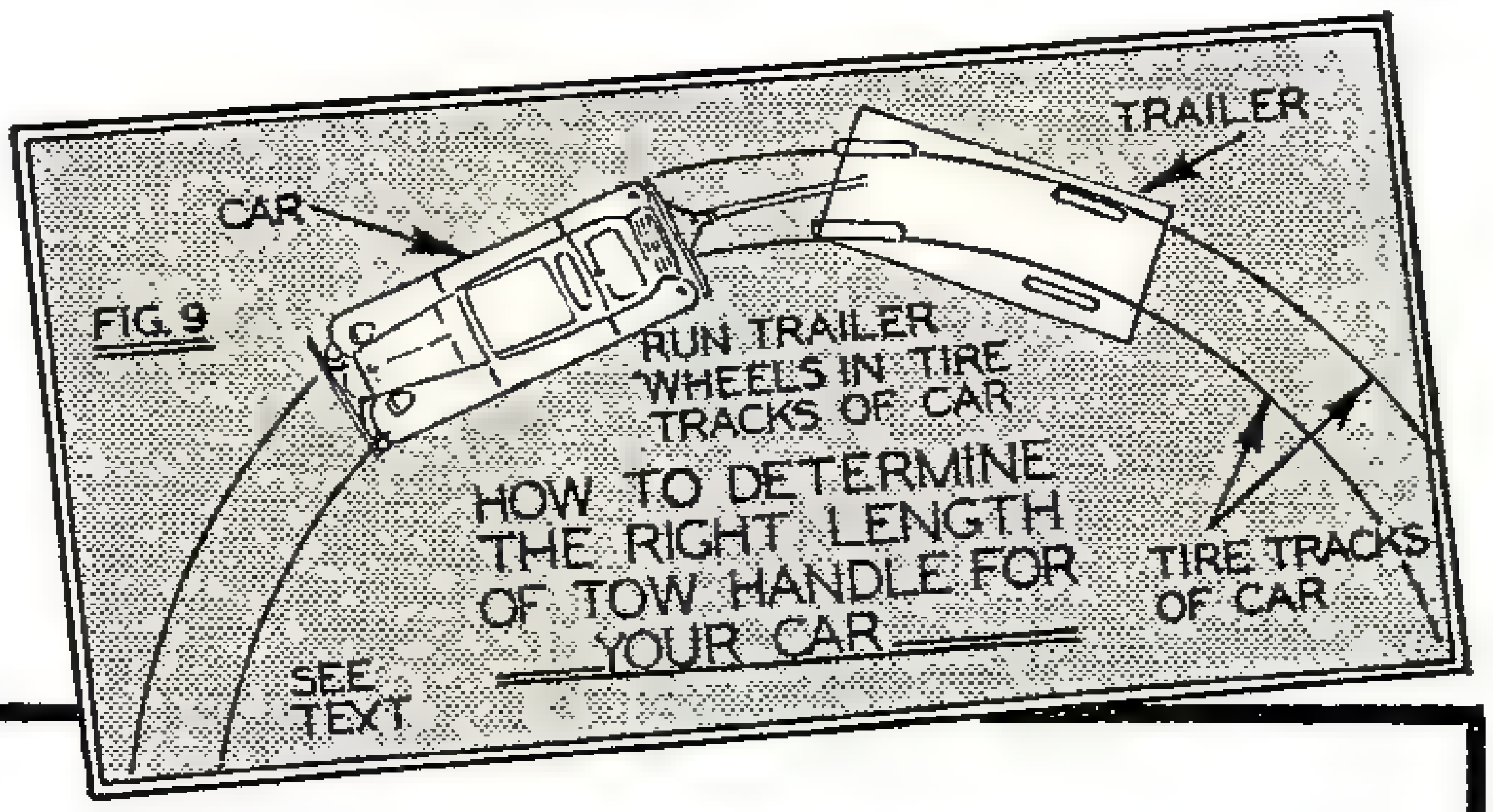
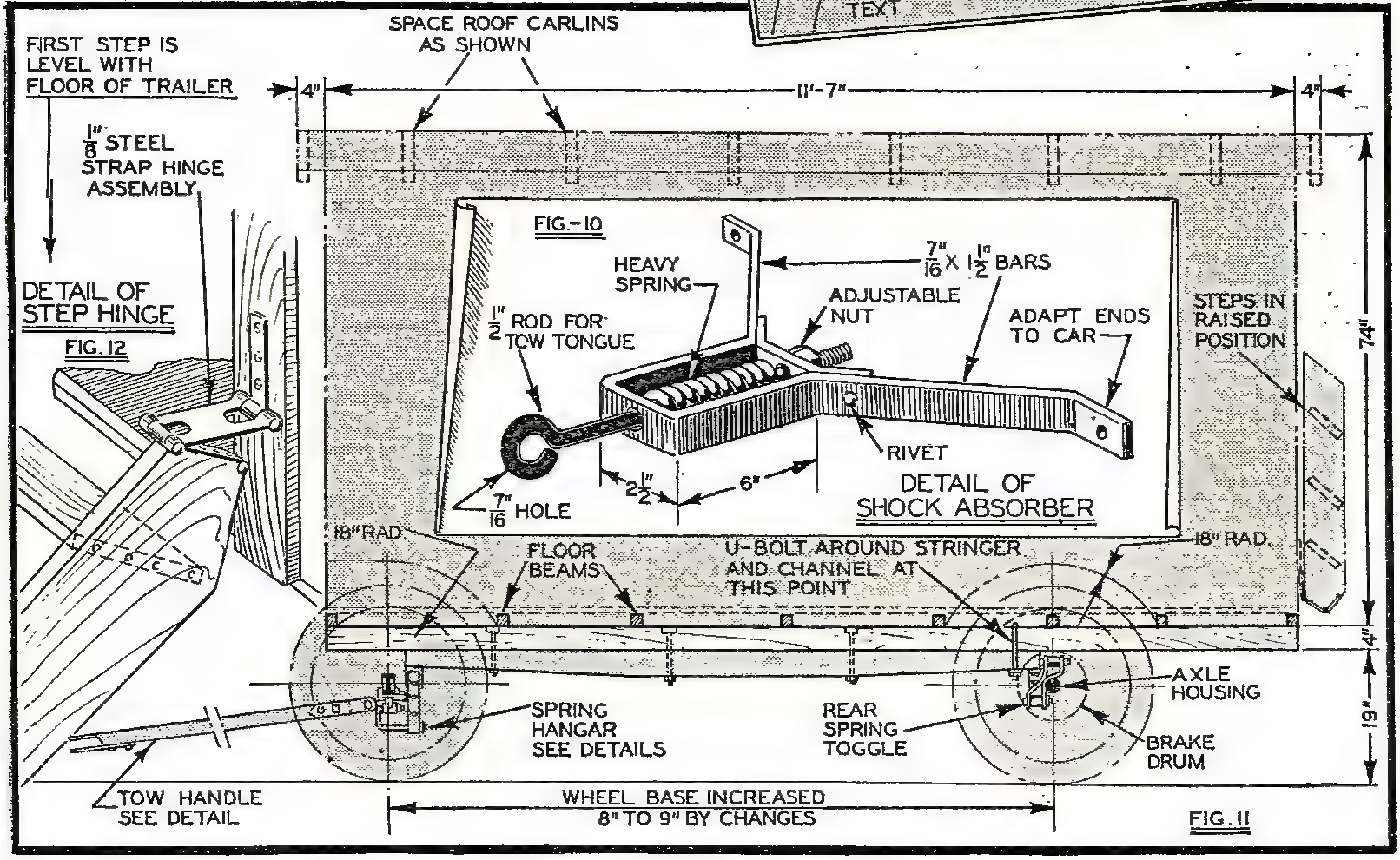


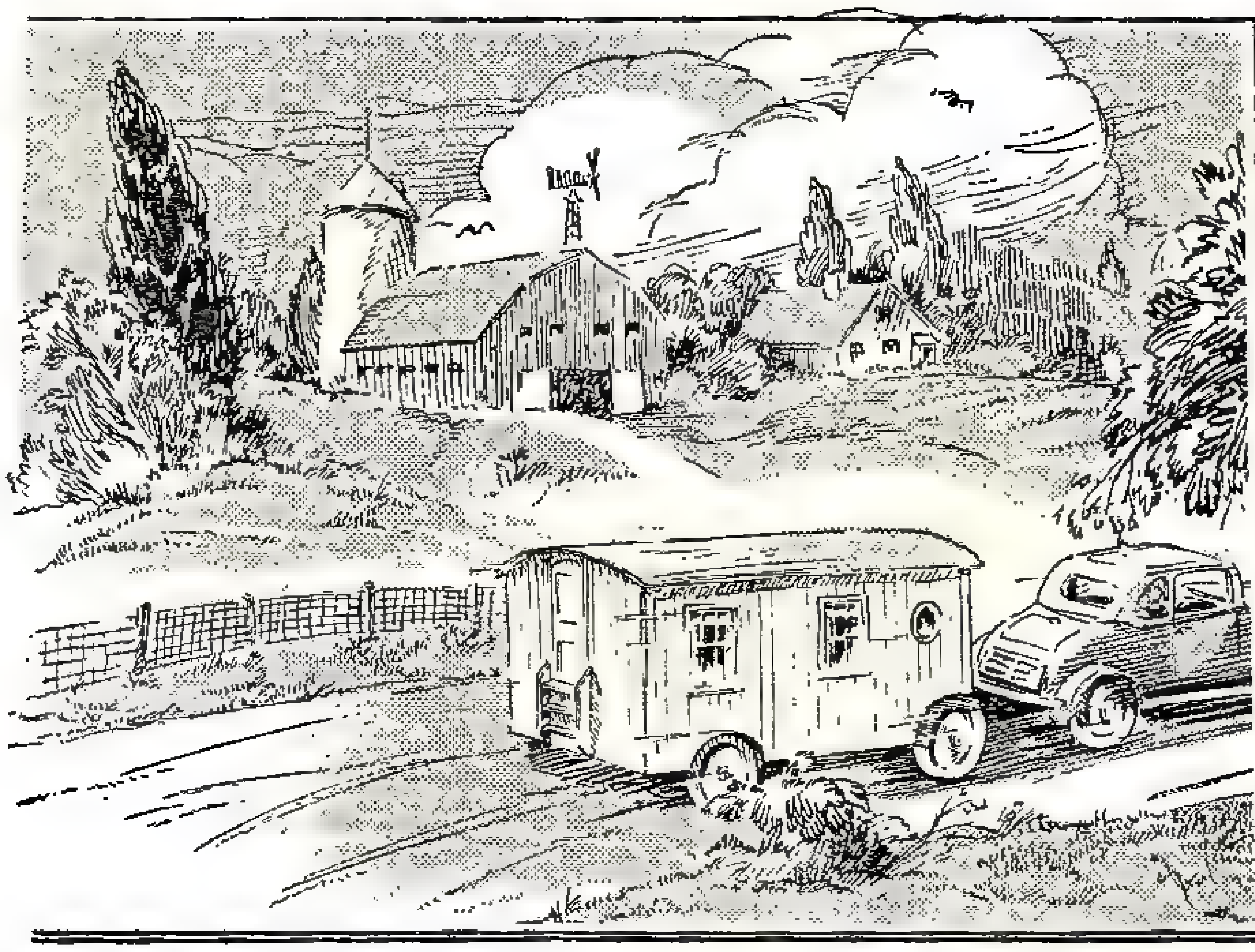
FIG. 9
CAR
TRAILER
RUN TRAILER WHEELS IN TIRE TRACKS OF CAR
HOW TO DETERMINE THE RIGHT LENGTH OF TOW HANDLE FOR YOUR CAR
TIRE TRACKS OF CAR
SEE TEXT


FIRST STEP IS LEVEL WITH FLOOR OF TRAILER
SPACE ROOF CARLINS AS SHOWN
4"
11'-7"
4"
1/8" STEEL STRAP HINGE ASSEMBLY
DETAIL OF STEP HINGE
FIG. 12
FIG.-10
HEAVY SPRING
7/16" X 1 1/2" BARS
ADJUSTABLE NUT
1/2" ROD FOR TOW TONGUE
ADAPT ENDS TO CAR
RIVET
2 1/2"
6"
7/16" HOLE
DETAIL OF SHOCK ABSORBER
STEPS IN RAISED POSITION
74"
18" RAD.
FLOOR BEAMS
U-BOLT AROUND STRINGER AND CHANNEL AT THIS POINT
18" RAD.
4"
AXLE HOUSING
19"
SPRING HANGAR SEE DETAILS
REAR SPRING TOGGLE
BRAKE DRUM
TOW HANDLE SEE DETAIL
WHEEL BASE INCREASED 8" TO 9" BY CHANGES
FIG. 11

The little drawing in Fig. 9 shows how to determine the right length of tongue for the towing arm. The middle inset shows a fine shock absorbing hook-up to be attached to the towing car. Fig. 11, below, shows how the stringers are attached to the channel frames after the chassis has been underslung.

Cruise TRAILER

by JIM ALLENBY



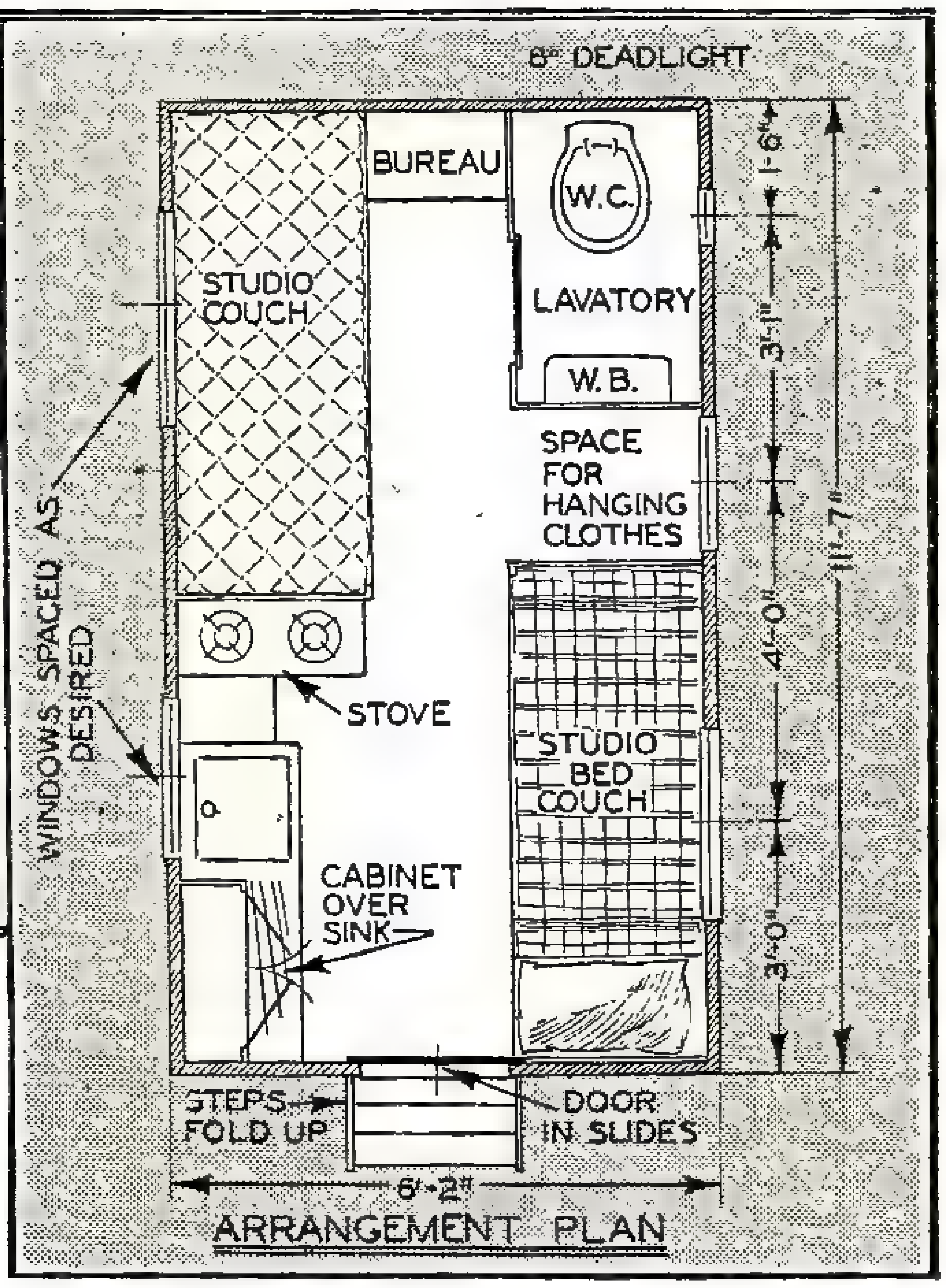
Trailer cruising has become really a smart thing for people to do. This Cabinette idea is just another step farther along toward the ultimate in inexpensive and practical trailers for tourists.

new spring perches, see Fig. 3, and the radius rods heated with a welding torch, bent, and re-seated. This takes care of the rear end, just as simple as that. See Fig. 8.

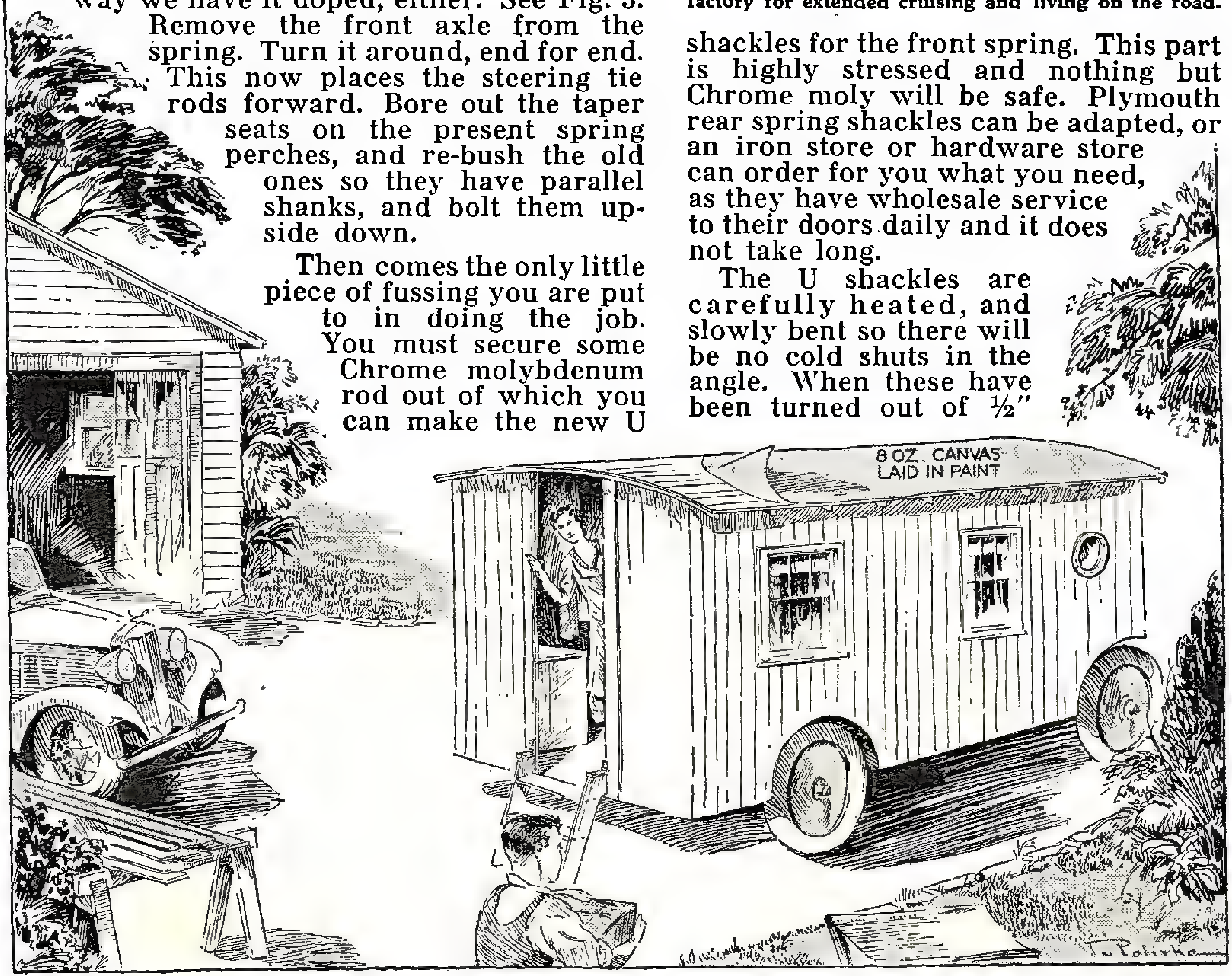
The front end underslinging is not hard the way we have it doped, either. See Fig. 3. Remove the front axle from the spring. Turn it around, end for end. This now places the steering tie rods forward. Bore out the taper seats on the present spring perches, and re-bush the old ones so they have parallel shanks, and bolt them upside down.

Then comes the only little piece of fussing you are put to in doing the job. You must secure some Chrome molybdenum rod out of which you can make the new U shackles for the front spring. This part is highly stressed and nothing but Chrome moly will be safe. Plymouth rear spring shackles can be adapted, or an iron store or hardware store can order for you what you need, as they have wholesale service to their doors daily and it does not take long.

The U shackles are carefully heated, and slowly bent so there will be no cold shuts in the angle. When these have been turned out of ½"


8" DEADLIGHT
BUREAU
W.C.
LAVATORY
W.B.
STUDIO COUCH
SPACE FOR HANGING CLOTHES
STOVE
STUDIO BED COUCH
CABINET OVER SINK
WINDOWS SPACED AS DESIRED
STEPS FOLD UP
DOOR IN SLIDES
1'-6"
3'-1"
4'-0"
3'-0"
11'-7"
6'-2"
ARRANGEMENT PLAN

Here's the arrangement that will prove most satisfactory for extended cruising and living on the road.


8 OZ. CANVAS LAID IN PAINT

The Cabinette cruising trailer can be wheeled to any spot, no matter how wild or how civilized, and be a self contained living unit with its own water and sewage system. Privacy, comfort and adequacy are all yours with this simple job.

stock for the ends to land in the spring and perches, they may be bent. The threading is, of course, done before any heating takes place.

The front radius rod is bolted to the strap cross arm which has been moved to fit. See Fig. 2. The ball of the radius rod is softened by annealing, ground to wafer shape, drilled as the details show.

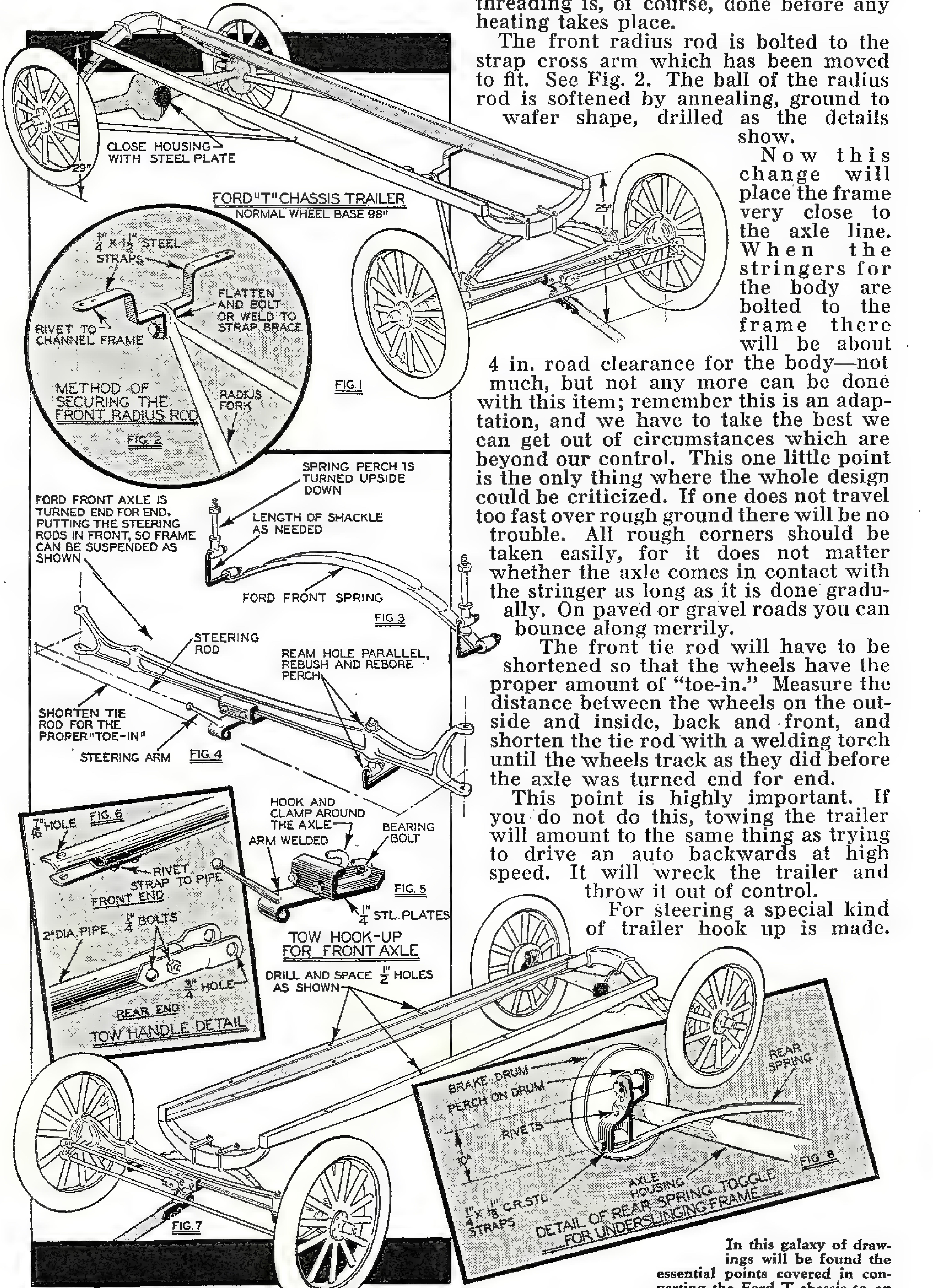
Now this change will place the frame very close to the axle line. When the stringers for the body are bolted to the frame there will be about 4 in. road clearance for the body—not much, but not any more can be done with this item; remember this is an adaptation, and we have to take the best we can get out of circumstances which are beyond our control. This one little point is the only thing where the whole design could be criticized. If one does not travel too fast over rough ground there will be no trouble. All rough corners should be taken easily, for it does not matter whether the axle comes in contact with the stringer as long as it is done gradually. On paved or gravel roads you can bounce along merrily.

The front tie rod will have to be shortened so that the wheels have the proper amount of "toe-in." Measure the distance between the wheels on the outside and inside, back and front, and shorten the tie rod with a welding torch until the wheels track as they did before the axle was turned end for end.

This point is highly important. If you do not do this, towing the trailer will amount to the same thing as trying to drive an auto backwards at high speed. It will wreck the trailer and throw it out of control.

For steering a special kind of trailer hook up is made.

Steps to Follow in Conversion


CLOSE HOUSING WITH STEEL PLATE
29"
FORD "T" CHASSIS TRAILER
NORMAL WHEEL BASE 98"
25"
FIG. 1
1/4" x 1 1/2" STEEL STRAPS
RIVET TO CHANNEL FRAME
FLATTEN AND BOLT OR WELD TO STRAP BRACE
METHOD OF SECURING THE FRONT RADIUS ROD
RADIUS FORK
FIG. 2
SPRING PERCH IS TURNED UPSIDE DOWN
LENGTH OF SHACKLE AS NEEDED
FORD FRONT AXLE IS TURNED END FOR END, PUTTING THE STEERING RODS IN FRONT, SO FRAME CAN BE SUSPENDED AS SHOWN
FORD FRONT SPRING
FIG. 3
STEERING ROD
REAM HOLE PARALLEL, REBUSH AND REBORE PERCH
SHORTEN TIE ROD FOR THE PROPER "TOE-IN"
STEERING ARM
FIG. 4
7/16" HOLE
FIG. 6
RIVET STRAP TO PIPE
FRONT END
2" DIA. PIPE
1/4" BOLTS
3/4" HOLE
REAR END
TOW HANDLE DETAIL
HOOK AND CLAMP AROUND THE AXLE
ARM WELDED
BEARING BOLT
FIG. 5
1/4" STL. PLATES
TOW HOOK-UP FOR FRONT AXLE
DRILL AND SPACE 1/2" HOLES AS SHOWN
FIG. 7
BRAKE DRUM
PERCH ON DRUM
RIVETS
10"
REAR SPRING
AXLE HOUSING
1/4" x 1 1/8" C.R. STL. STRAPS
FIG. 8
DETAIL OF REAR SPRING TOGGLE FOR UNDERSLINGING FRAME

In this galaxy of drawings will be found the essential points covered in converting the Ford T chassis to an underslung trailer chassis. Fig. 1 shows normal Ford chassis but with tie rods in front. Below is shown chassis finally converted.

See Figs. 4, 5 and 6. The drawings show how a plate of ¼" wrought iron is bent around the axle, and secured with two ½" hook bolts which can be made by any blacksmith.

A ¾" hardened steel pin is run through the towing tongue and this plate. It forms the pintle through which the towing and turning stresses are focused. It therefore must be this heavy, and be hardened.

The Trailer Tongue

The tongue itself is of pipe. Two-inch pipe will do. An alligator mouth is sawed in one end, and a piece of hardened strap is riveted on the end. If the pipe is left top and bottom to carry the load it will soon chew off and you are in danger of losing your trailer. With a piece of hardened strap on the tongue you know *that* can never give way.

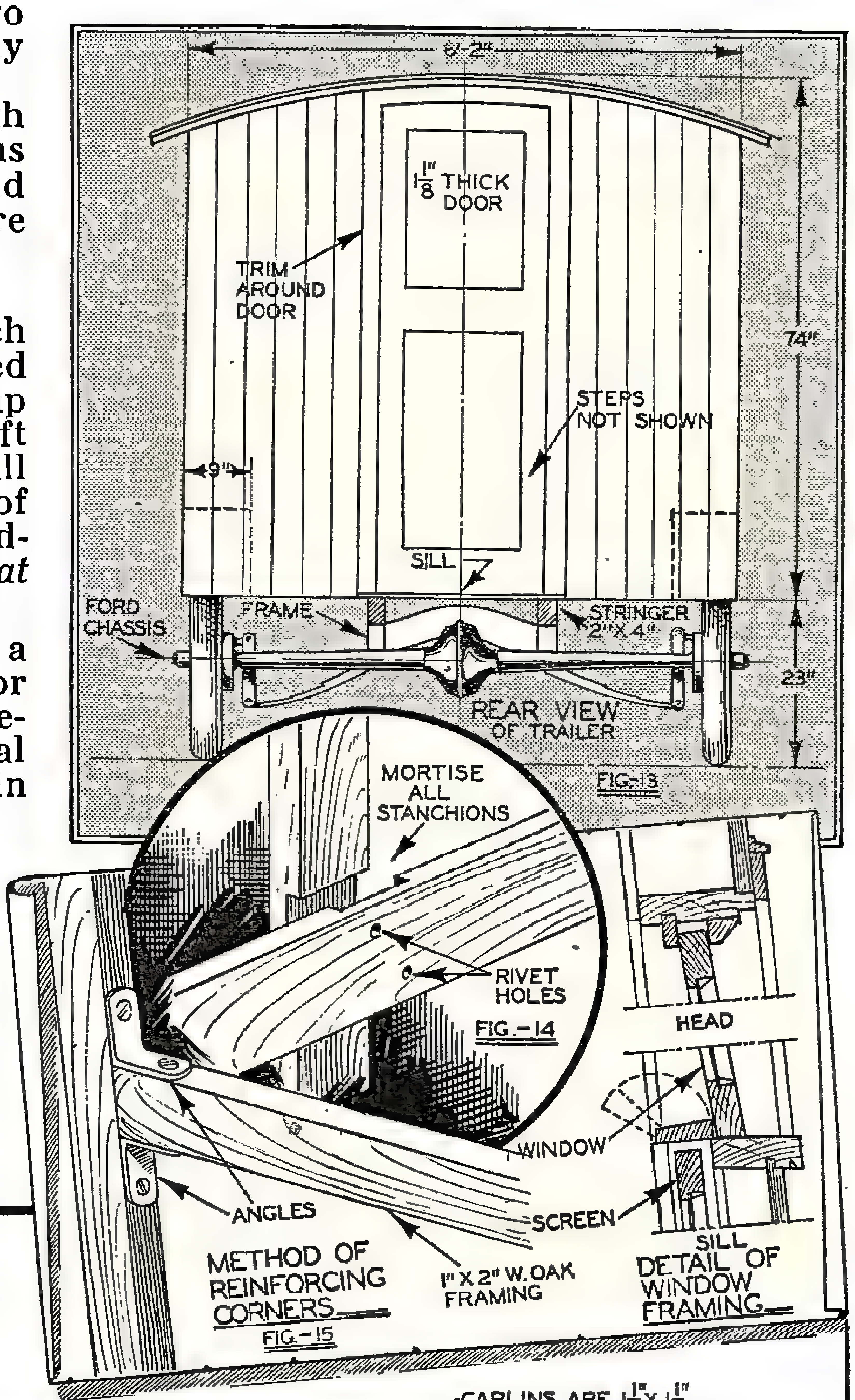
The strap for the tongue makes this a universal joint, and it is stiff enough for towing and steering. An ideal arrangement, and it has proven itself on several hauls of over three hundred miles in length already.

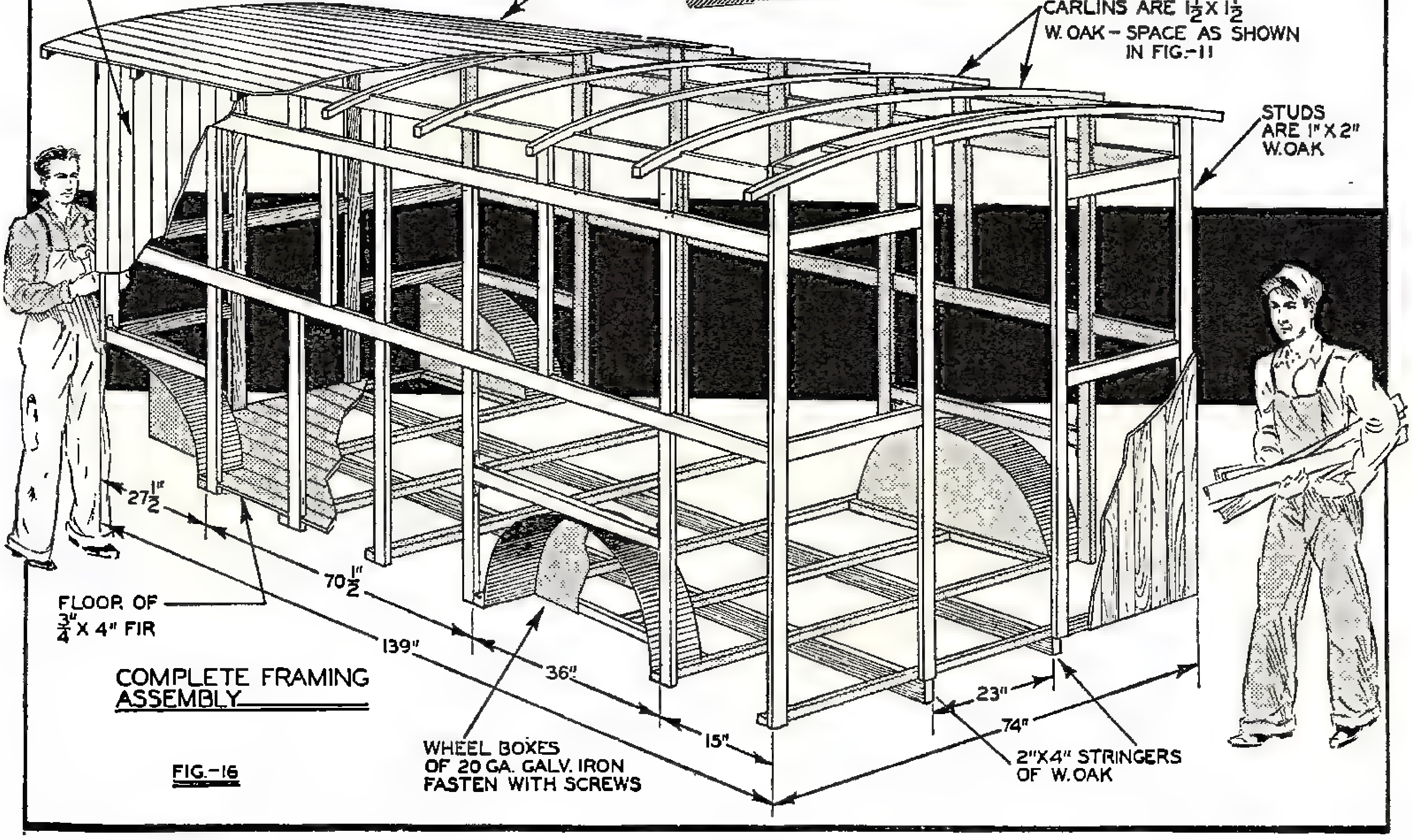
With these changes made, you are ready for the body, but I have one more word to offer.

About the tongue length: Every car has its own turning radius, and so does a trailer. The two must have a tongue of just the right length, otherwise both towing and corner-taking will be

(Continued on page 138)

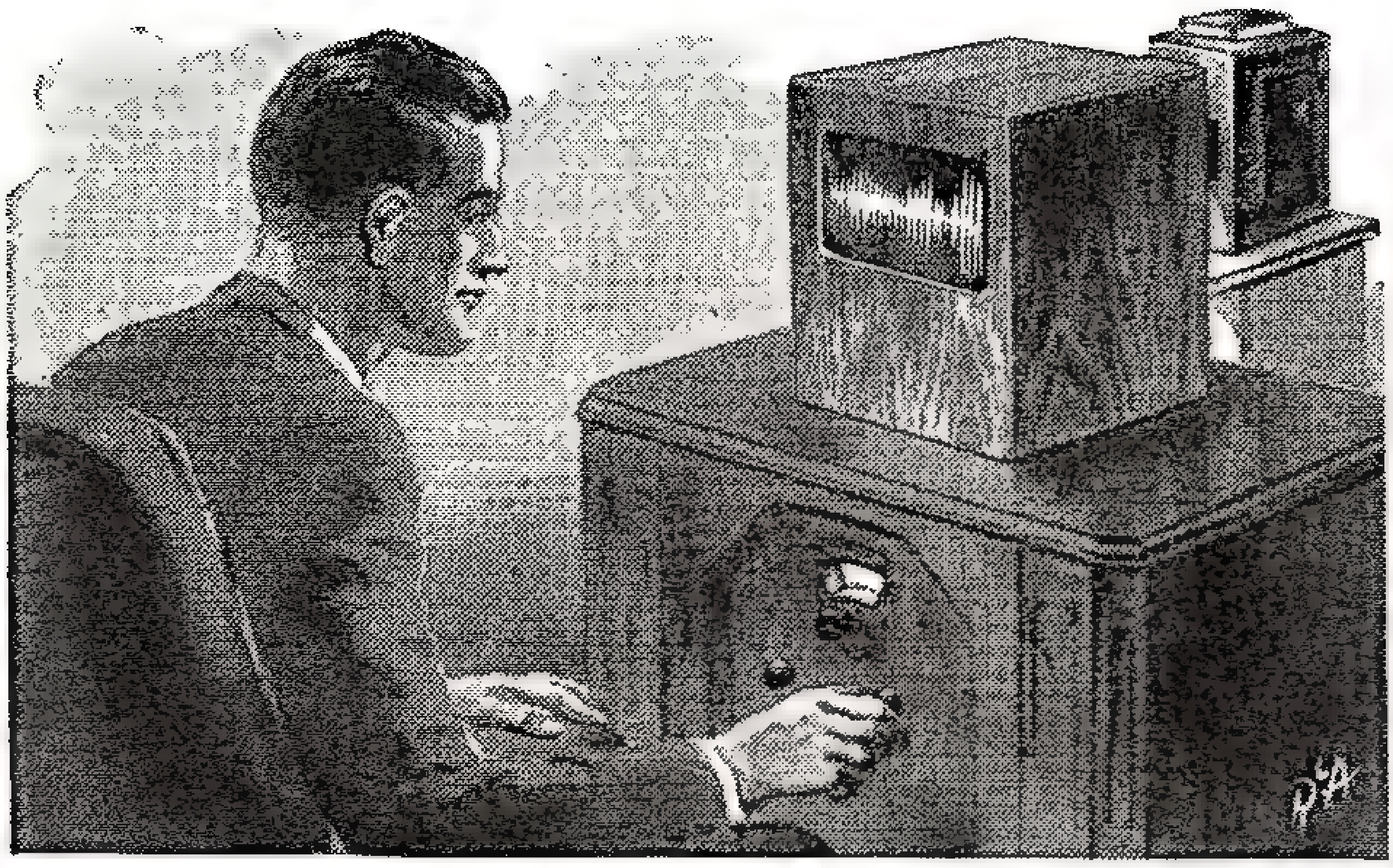
Details of Strong, Simple Framing


6'-2"
1⅛" THICK DOOR
TRIM AROUND DOOR
74"
STEPS NOT SHOWN
9"
SILL
FORD CHASSIS
FRAME
STRINGER 2"X4"
23"
REAR VIEW OF TRAILER
FIG.-13
MORTISE ALL STANCHIONS
RIVET HOLES
FIG.-14
HEAD
WINDOW
SCREEN
SILL
ANGLES
METHOD OF REINFORCING CORNERS
FIG.-15
1"X2" W.OAK FRAMING
DETAIL OF WINDOW FRAMING

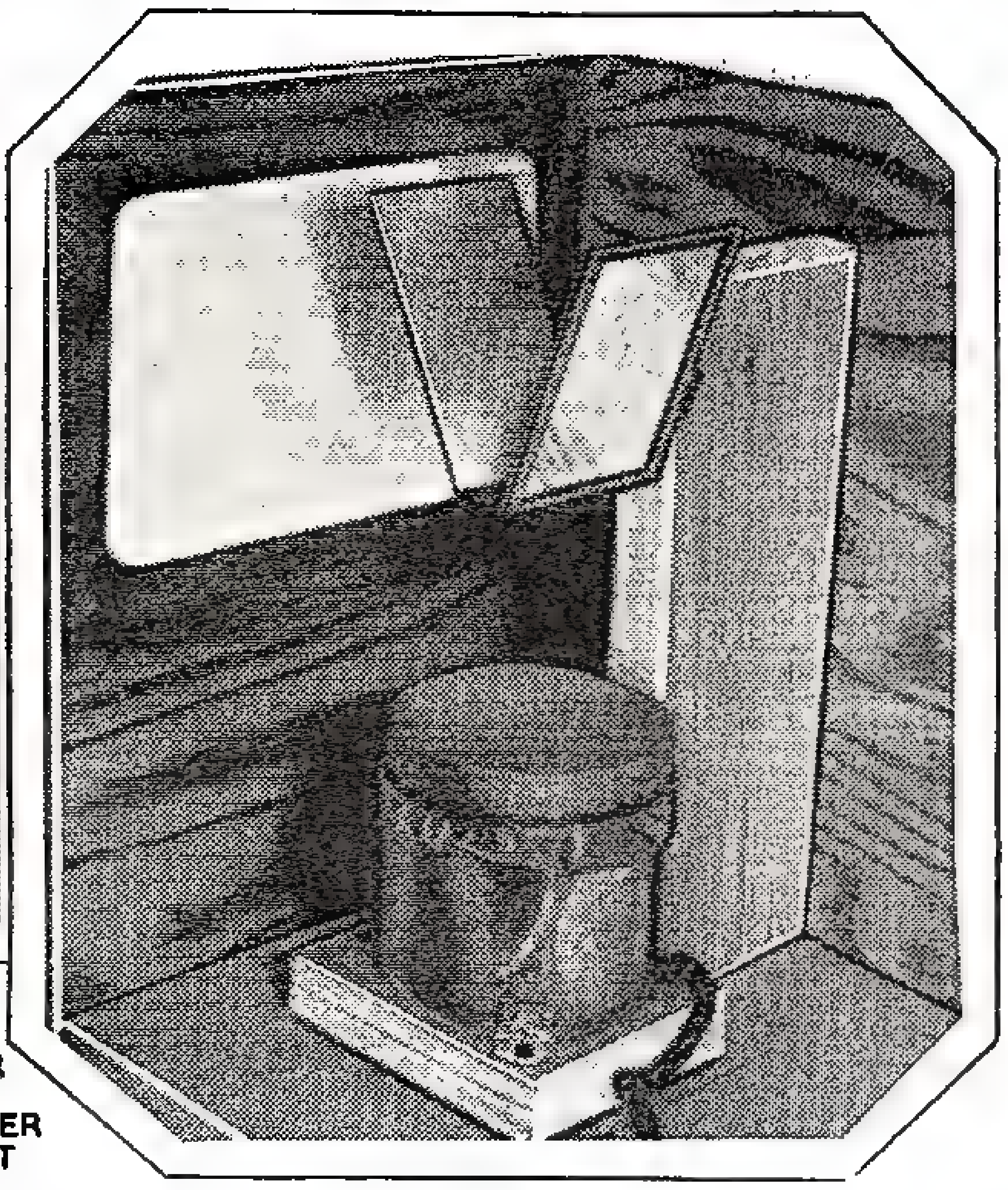

ALL SIDES OF ½"X4" BEADED CEDAR, FASTEN WITH SCREWS
ROOF COVERING OF ½"X4" BEADED CEDAR NAILED.-COVERED WITH 8OZ. CANVAS
CARLINS ARE 1½"X1½" W.OAK - SPACE AS SHOWN IN FIG.-11
STUDS ARE 1"X2" W.OAK
27½"
70½"
FLOOR OF ¾"X4" FIR
139"
36"
15"
23"
74"
COMPLETE FRAMING ASSEMBLY
FIG.-16
WHEEL BOXES OF 20 GA. GALV. IRON FASTEN WITH SCREWS
2"X4" STRINGERS OF W.OAK

Top right shows rear elevation with miscellaneous details. Middle detail, Figs. 14 and 15, show framing and window details. Below in Fig. 16 are shown major elements in straightforward framing plan. Materials can be procured locally.

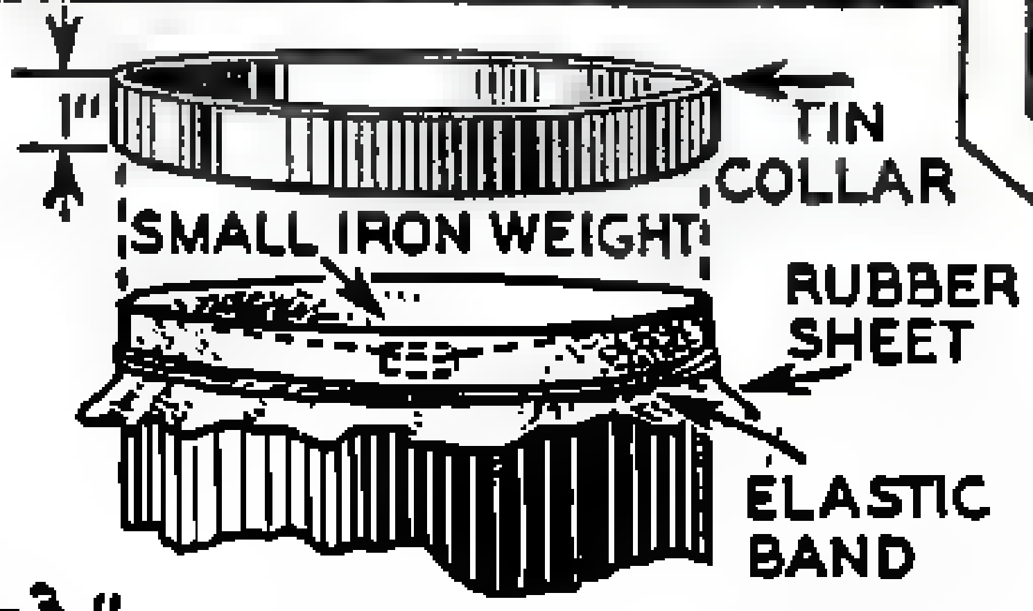
"Vibrometer" Makes Radio Music Visible

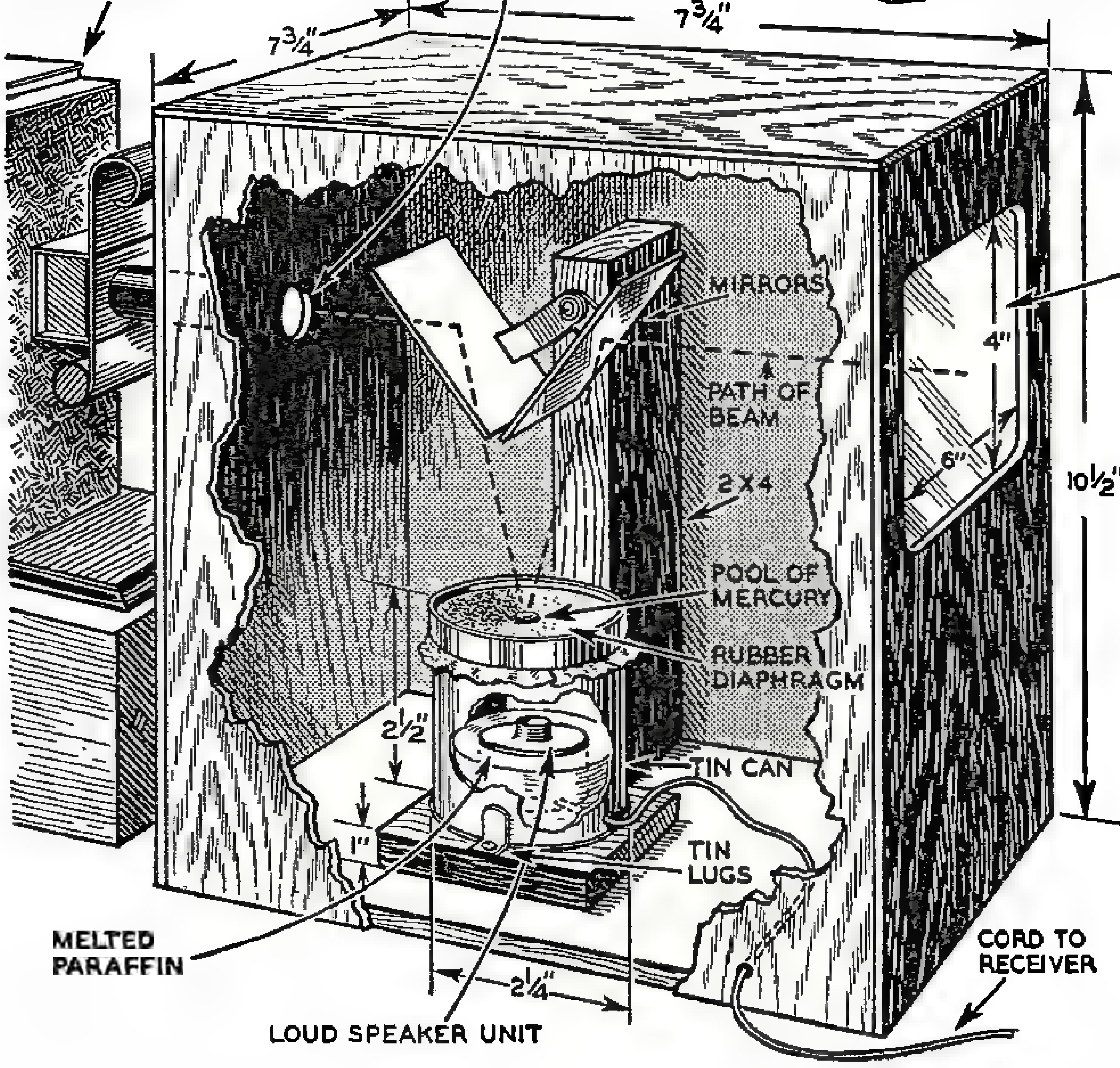


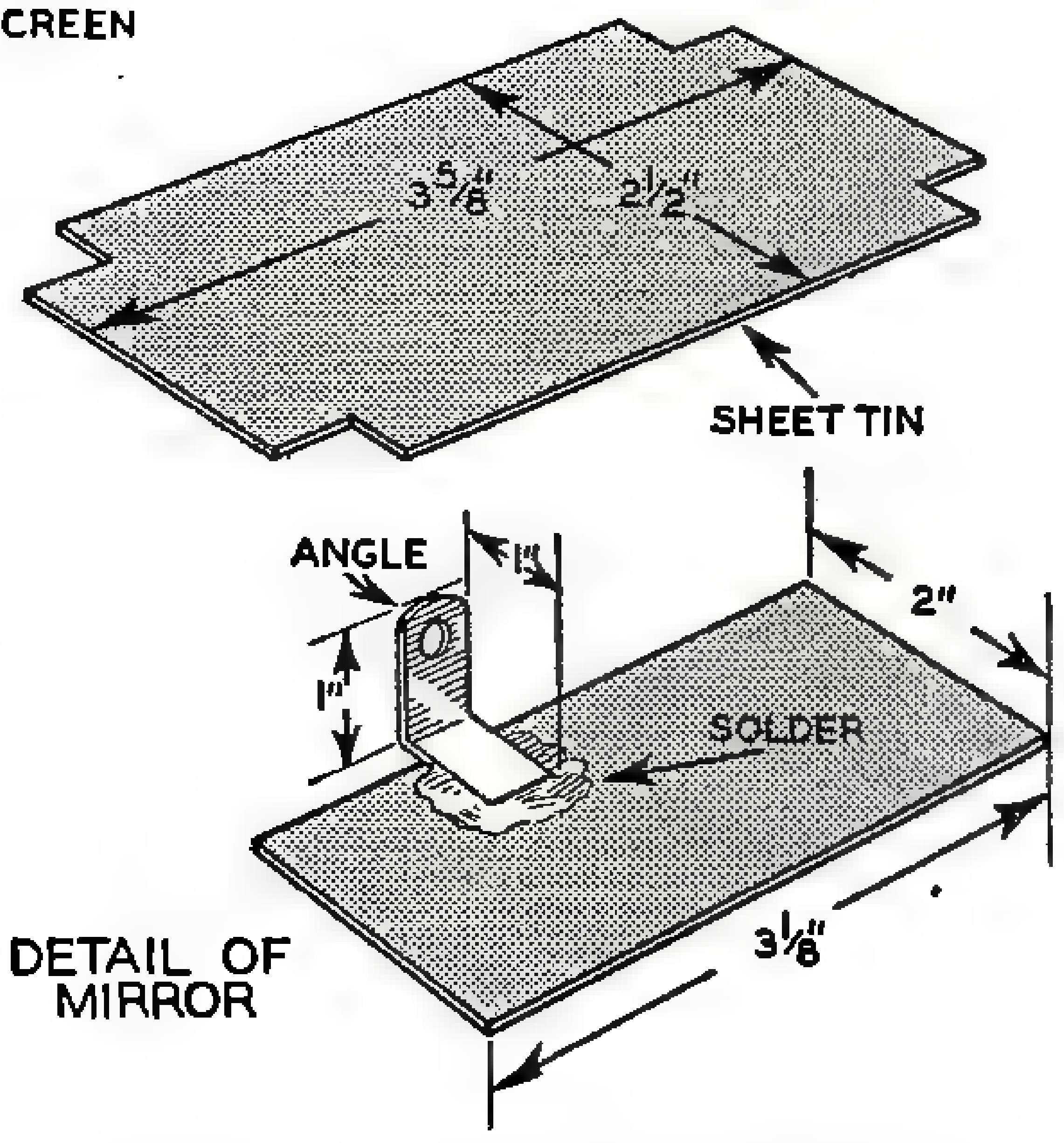
Music and voice from radio is produced in sound patterns on the screen of the "vibrometer," as shown in drawing above.



Interior view of the "vibrometer" shows how mirrors are mounted on the 2x4. Beneath is seen the can over which is stretched the rubber holding the pool of mercury. Light beam reflected from mirror fluctuates on screen due to motions of the mercury mirror.


1"
TIN COLLAR
SMALL IRON WEIGHT
RUBBER SHEET
ELASTIC BAND


LIGHT PROJECTOR
OPENING FOR LIGHT BEAM
7¾"
7¾"
TRANSLUCENT SCREEN
MIRRORS
PATH OF BEAM
4"
6"
2X4
10½"
POOL OF MERCURY
RUBBER DIAPHRAGM
2½"
TIN CAN
1"
TIN LUGS
MELTED PARAFFIN
2¼"
CORD TO RECEIVER
LOUD SPEAKER UNIT


3⅝"
2½"
SHEET TIN
ANGLE
1"
1"
2"
SOLDER
3⅛"
DETAIL OF MIRROR

Details of construction are seen here. Considerable care is required in the proper adjustment of mirrors. Beam strikes center of screen.

WITH the simple little instrument here described, a whole new world of radio experimentation is opened to the amateur. On a screen you are enabled actually to see the strange effects of sound waves and the endless variety of patterns, many of them curiously beautiful, that are produced by the incoming music and voice in a radio receiver.

The pattern producing instrument is made by placing a small radio loudspeaker unit, preferably of the Baldwin type, in a tin can in the manner illustrated in the drawings above. A half pint lacquer or paint can is just the right size to accommodate the average small unit.

Two tin lugs are soldered to the can to hold it down to the baseboard. Inasmuch as a dead sound chamber must be produced between the loudspeaker unit and the rubber diaphragm, it will be necessary to pour melted paraffine in the space that exists between the loud speaker unit and the tin can.

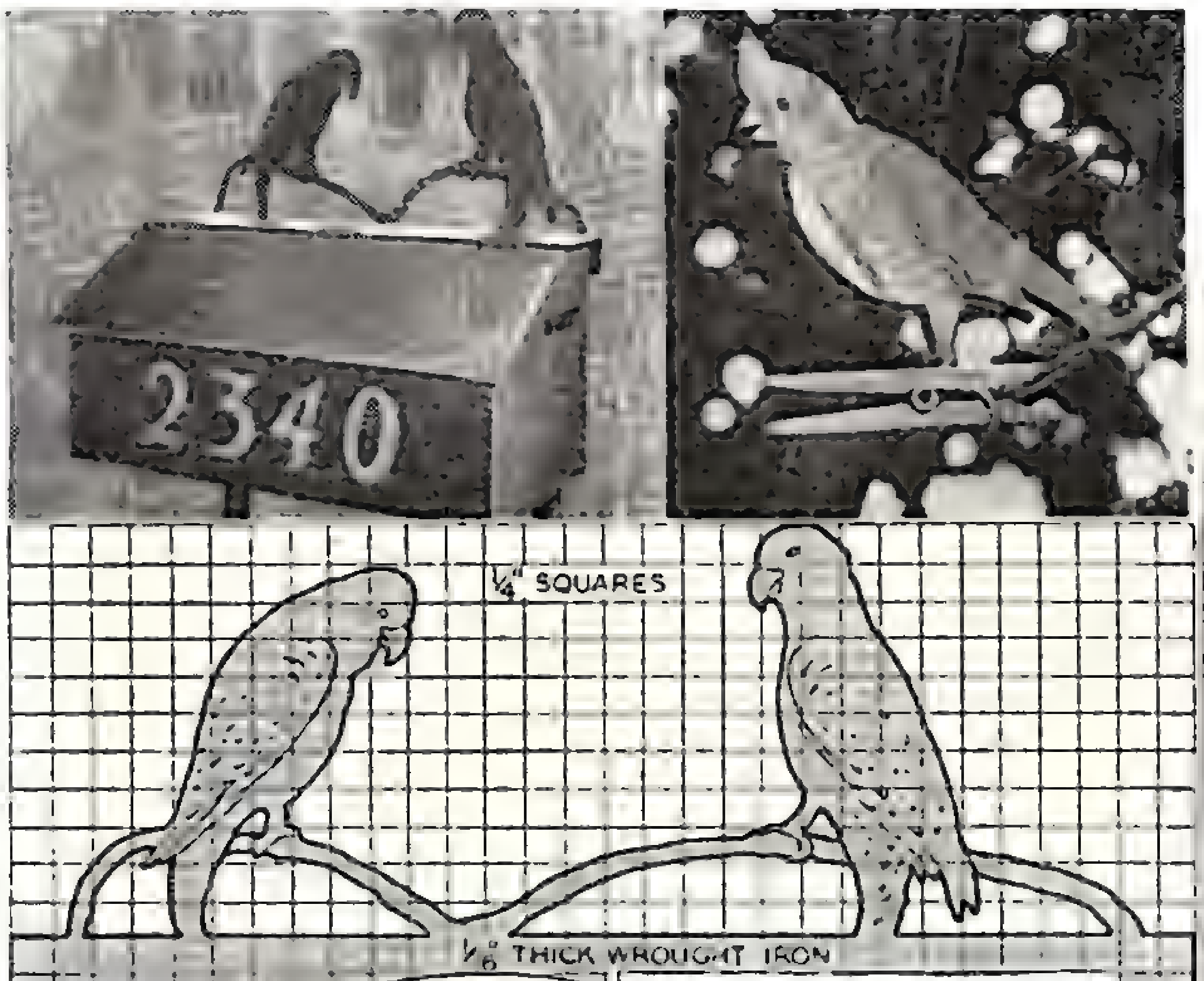
The rubber diaphragm must be very thin for best results. The writer used a rubber balloon and strong rubber bands to bind it over the top of the can. The degree of tautness of the rubber diaphragm will depend somewhat upon the power the loudspeaker and the current fed into it. It's mainly a "cut and try" job.

Inasmuch as a small pool of mercury is

(Continued on page 142)

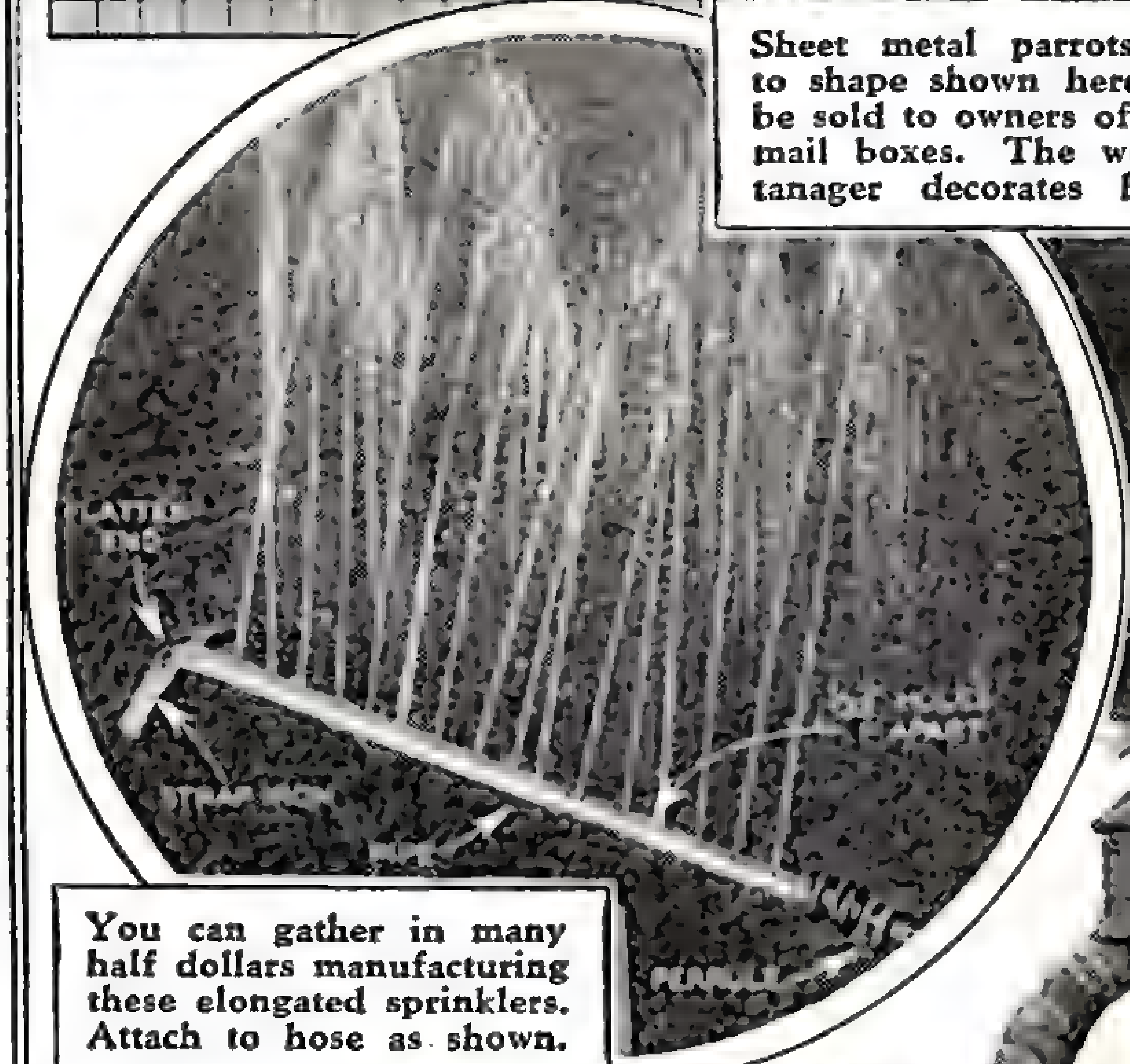
Make Spring PROFITS on Outdoor Ideas

Home-owners Will Welcome These Backyard Accessories

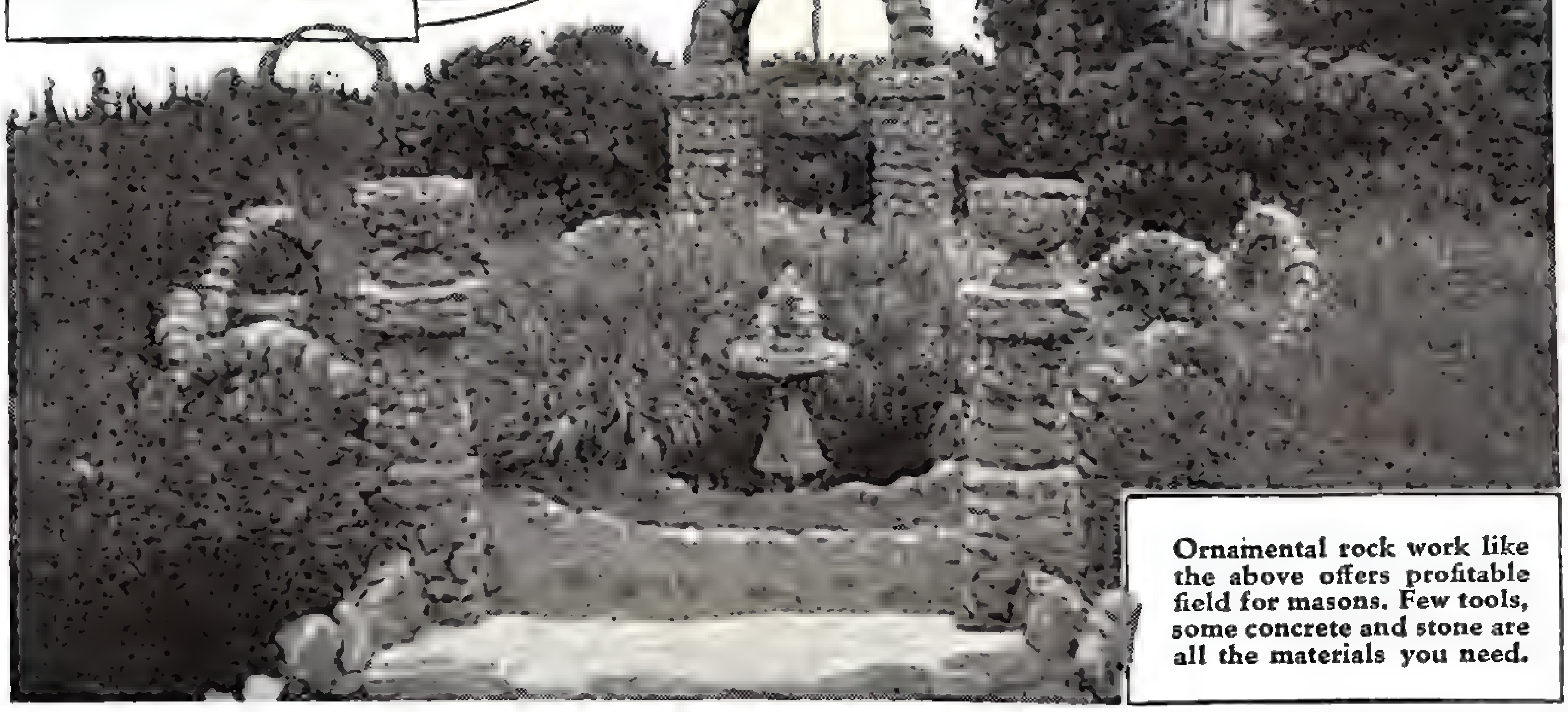


Sheet metal parrots, cut to shape shown here, can be sold to owners of rural mail boxes. The wooden tanager decorates hedge.

Playground slides on estates of well-to-do people with children will yield profits. Plans are suggested in photo.

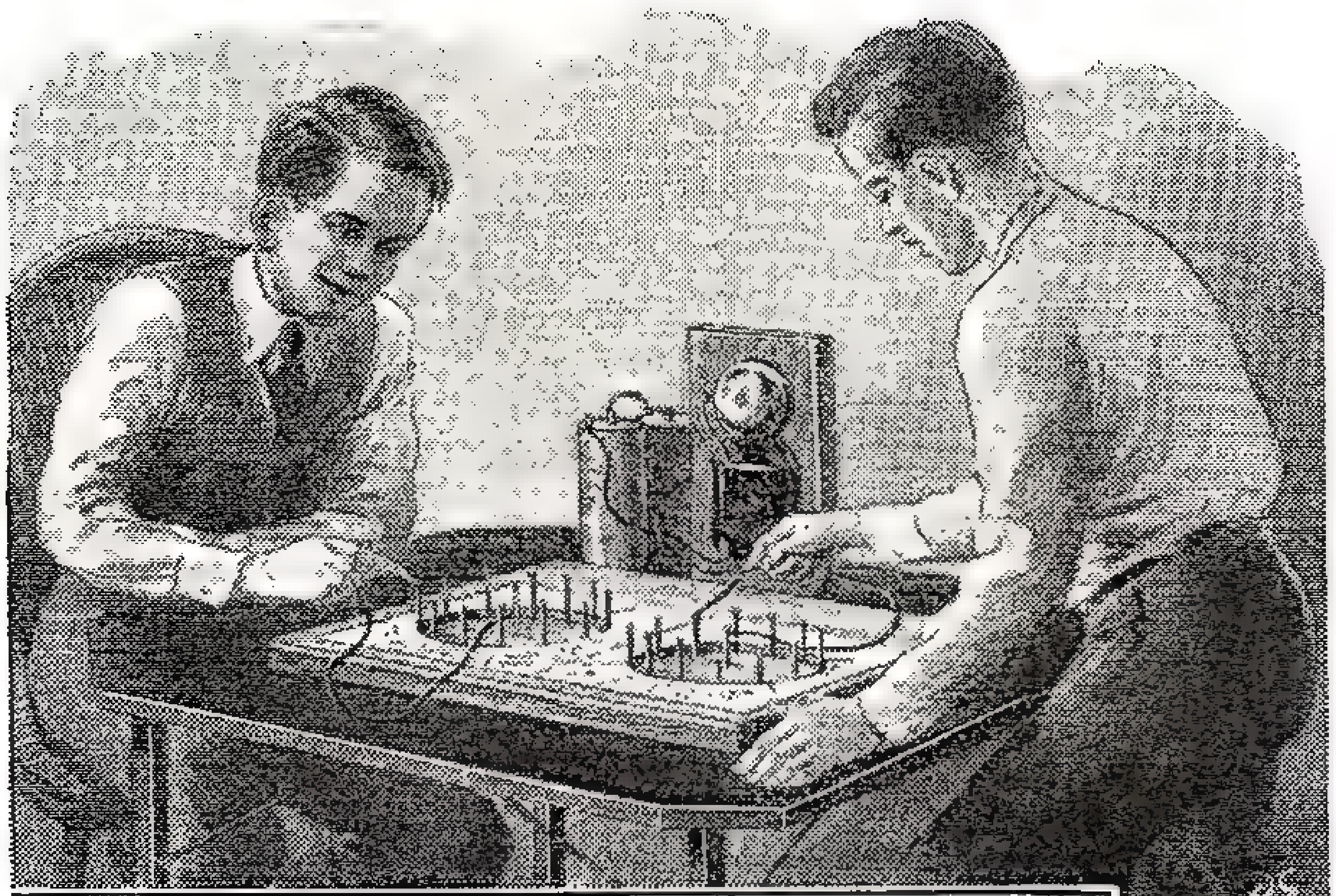


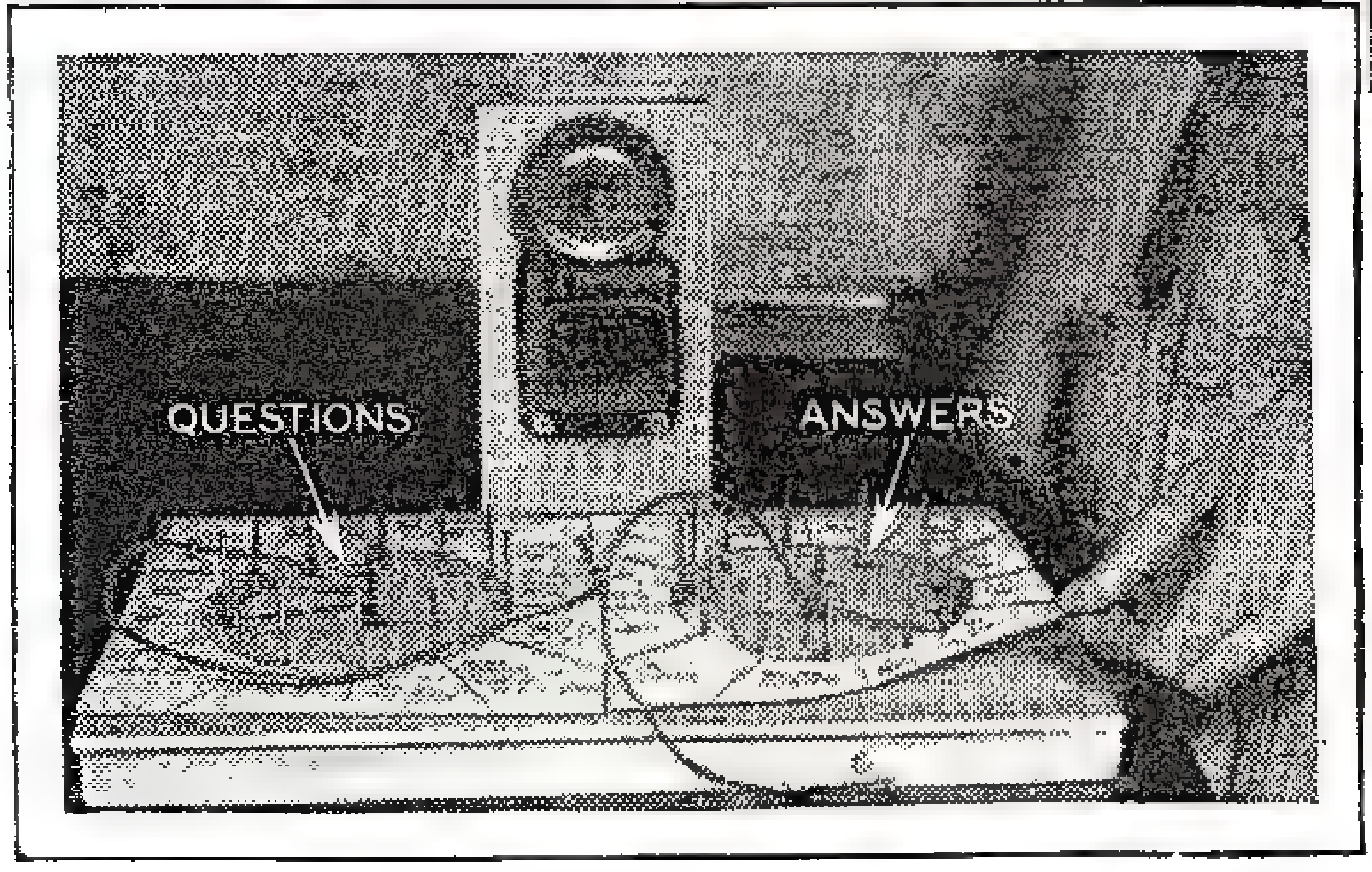
You can gather in many half dollars manufacturing these elongated sprinklers. Attach to hose as shown.



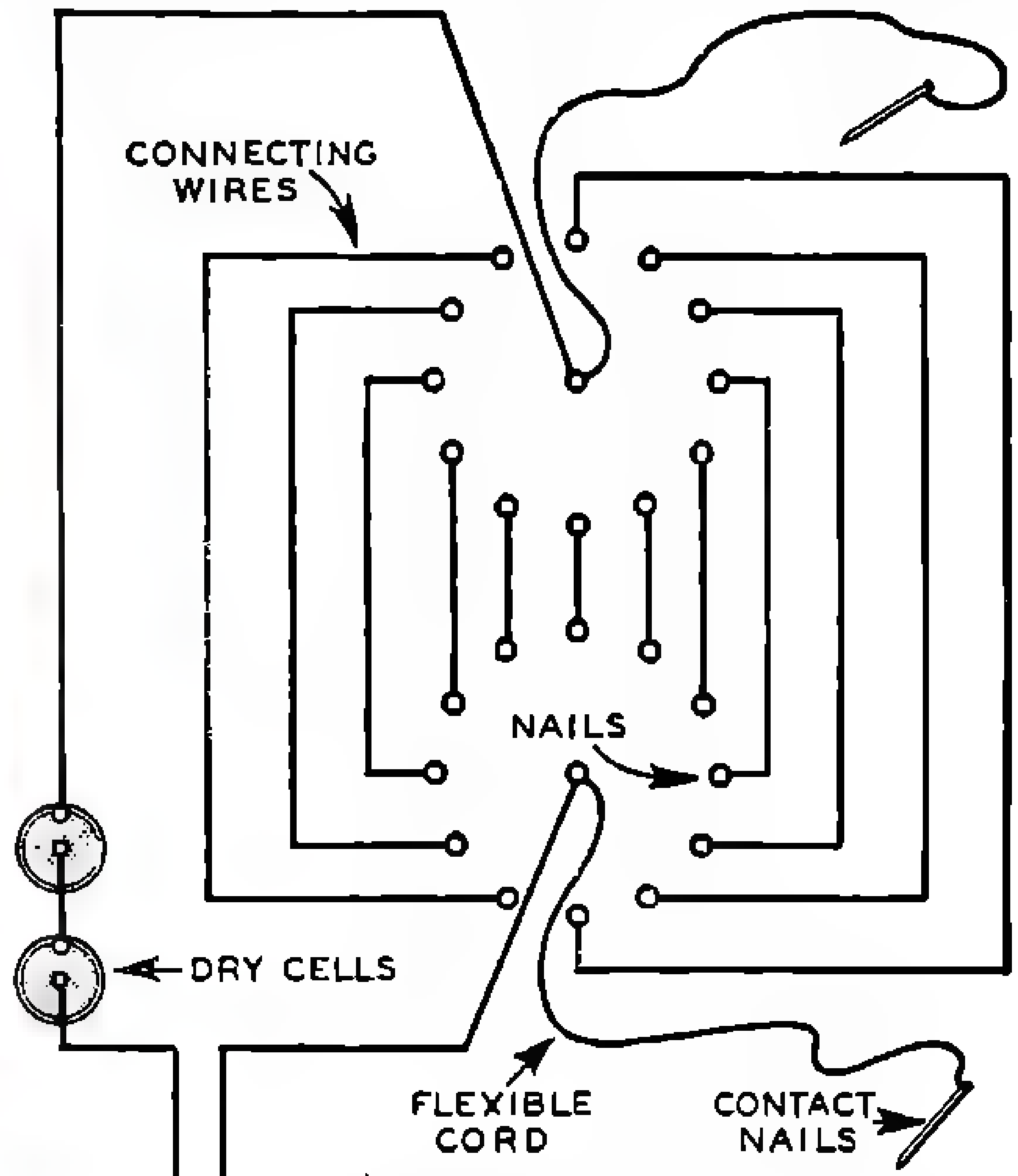
Ornamental rock work like the above offers profitable field for masons. Few tools, some concrete and stone are all the materials you need.

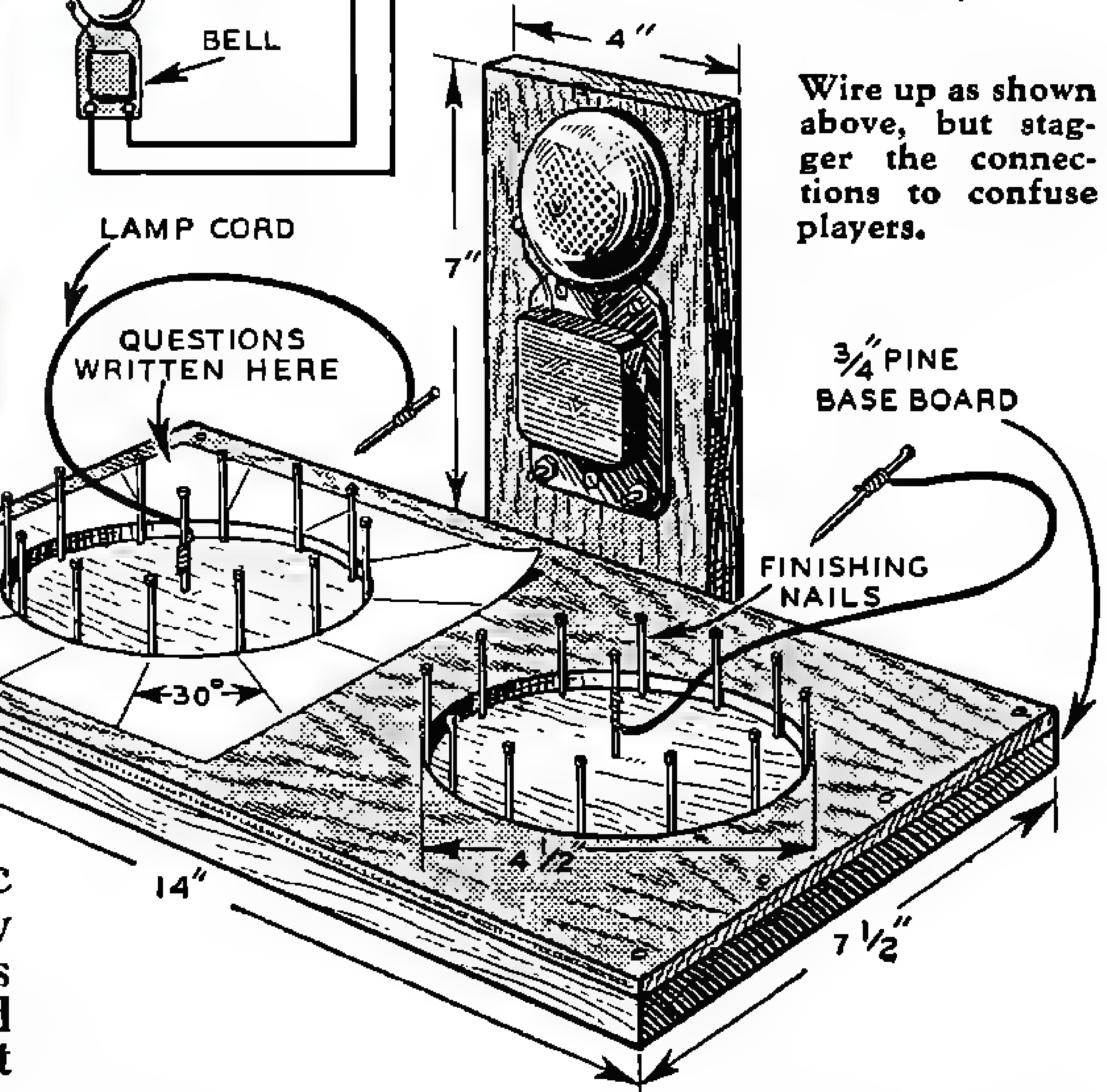
Electric Question Game Amuses, Educates





Interrogating party playing the question and answer game touches a nail in some question sector whereupon the "interrogatee" touches a nail indicating the corresponding answer. If he hits it correct the bell will ring. Circles on the bristol board on which the questions and answers are written are divided into 12 sections for as many questions, as shown in photo.





Wire up as shown above, but stagger the connections to confuse players.

Nails are driven in baseboard in positions shown above and covered by the plywood to conceal the wiring.

ALTHOUGH this simple form of electric question machine was made originally to interest a boy about ten years old, it was brought out at an adult party recently and served to amuse a number of guests for at least a period of one hour. Such is the fascination it offers.

Begin construction by making two circles on a base board as shown, dividing it equally in twelve parts. At every point a six-penny nail is driven into the base, bell wire being used to connect the two sets of nails together electrically. Stagger the connections to confuse the players.

Now a nail is driven exactly in the center of each circle and this is also connected in the manner illustrated in an accompanying drawing.

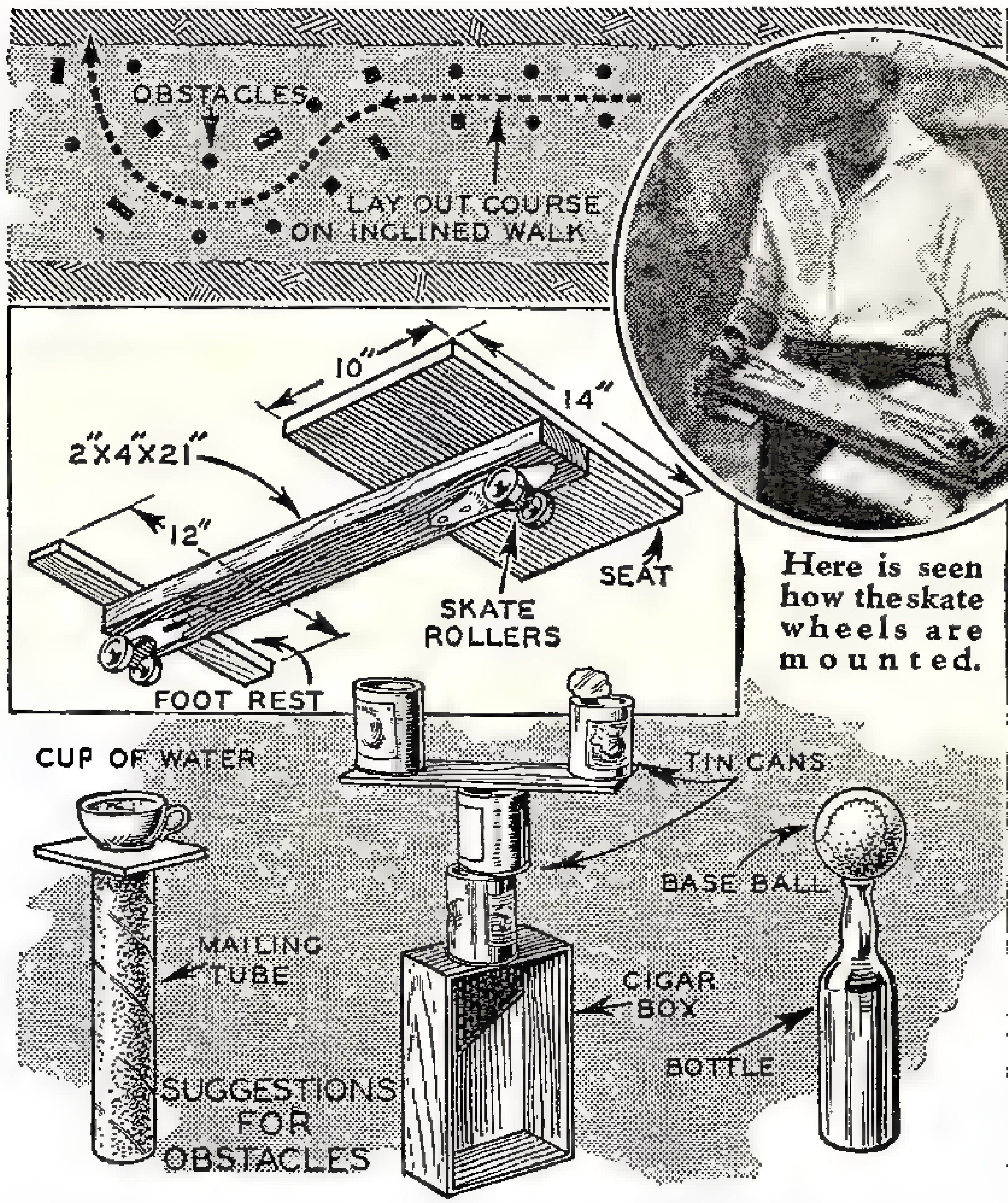
Construction is continued by cutting out a piece of plywood the same size as the baseboard, with holes in it a little larger in diameter than the circle formed by the nails. Nailed down, this plywood covers up all of the connections. Connect up the board as illustrated in the wiring diagram.

The circuit should be so laid out that when the nail on the question side is brought into contact with the nail near one of the questions, and when the nail at the end of the flexible cord on the other side of the board is brought in contact with the correct answer, the bell will ring.

To make the questions and answers, heavy paper or bristol board is used with circles cut large enough so that they will clear the nails. Each piece of paper or bristol board is divided into twelve parts and the questions and answers are placed in these sections. Naturally, when the correct answer is given, it should not be written in way that will give the user a clue as to which nail should be searched out.

Another thing worth remembering for those who use the game with children is that some effort should be made to link the questions and answers up with their school work. Thus the game is a sugar coated method of driving the difficult lessons home.

Ride in Backyard Steeplechase; Keen Fun



Here is seen how the skate wheels are mounted.

Obstacles which collapse at a collision with the coaster are set up as illustrated here. Lay out your course in the manner suggested in the drawing at the top.

HERE is an exciting game which can be played by all the neighborhood gang with the simplest of equipment. A winding course is made on a sloping sidewalk or driveway, the boundaries marked by a series of obstacles such as bottles, tin cans, cigar boxes and other objects which are easily toppled over.

It takes real skill to negotiate the course without colliding with obstacles. The coaster is steered by leaning to one side or other. Perfect score entitles you to another ride.

With a small coaster made of odd pieces of wood and a roller skate, as shown in the perspective drawing, the player coasts down the line and attempts to avoid all the hazards. Steering is entirely by balance, and with practice one can become expert.

Penalties are charged for knocking over the obstacles, the most unstable ones drawing a light penalty, such as one, and the most stable ones as high as five. A perfect score, or lack of any penalty, entitles the player to get another turn, or to ride until he does knock over an obstacle. A suggestion for hazards is given in the drawings above. Others more elaborate can be worked out. Ordinary bottles and tin cans will make adequate obstructions.

Shock Type Screwdriver Loosens Tightest Screws With Little Effort

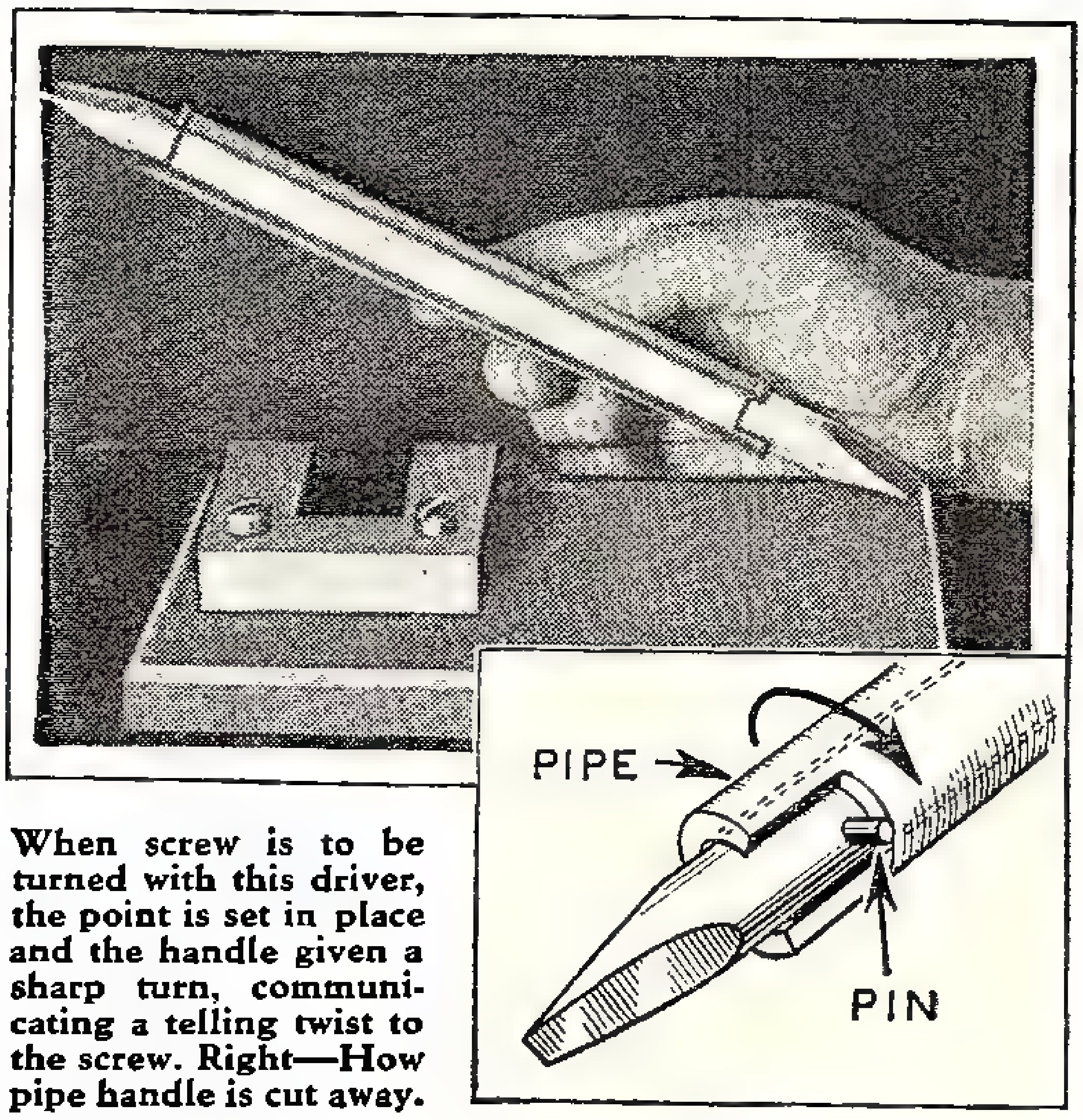
STUBBORN screws can be easily loosened with a new kind of screwdriver, shown in the accompanying photo. This tool has a blade at each end to take large and medium size screws.

Slipped over the screwdriver proper is a piece of iron pipe, both ends of which are cut half away so that the pipe can only turn on the screwdriver about half way before it is stopped by the pins.

When loosening a screw, the tool is gripped by the pipe and turned quickly. The pipe stops on the pins and delivers a sharp blow on the screwdriver, with a much better loosening effect than the steady twist of a regular screwdriver.

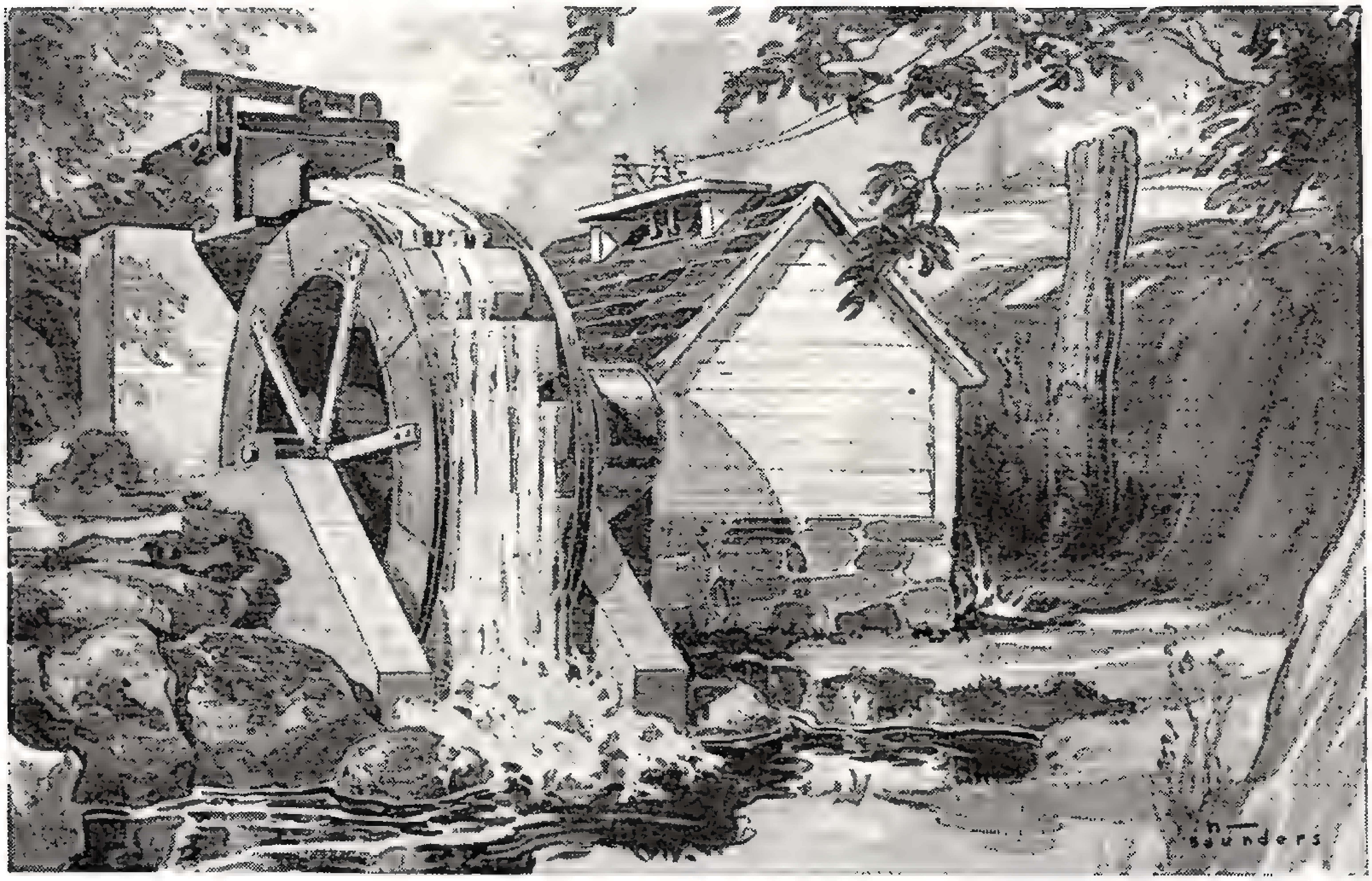
The screwdriver point may be made to fit loosely in the pipe to permit change of size. If you need a longer tool simply lengthen the pipe.

The pins are made of small nails inserted in holes bored in the points. Let them come flush with the pipe.



When screw is to be turned with this driver, the point is set in place and the handle given a sharp turn, communicating a telling twist to the screw. Right—How pipe handle is cut away.

A Wooden WATER Wheel



All that is needed is a six-foot head on a 16"x16" flume in order to get 1½ h.p. from this simple wheel. It is of the overshot type, and housed in the dog house above are the pump and dynamo it is capable of driving day in and day out.

This simple wheel will develop a full one and one-half horsepower on a head of only six feet through a sixteen inch flume. Many farms can take advantage of natural resources in securing light and power this way.

by JOHN S. CARPENTER

HERE are complete plans and instructions to build a 5 foot rustic wheel for the farm—one developing under only 6 foot fall at full capacity, an honest 1½ horse power! It will drive a 1 kilowatt electric generator at night and the house pump by day; furnish about 30 twenty five watt lights at night and lots of water by day.

First, cut out 24 curved segments as shown in Fig. 1, to make the two side rims. Each rim is to have two layers, break the joints midway and nail together with cement coated nails, if you can get them, on 3 inch centers. Cut the segments out on a band saw to dimensions. One segment takes a piece of lumber 11x¾x30 inches exact.

Now cut out 46 pieces of 3x¾x19 inches long tongue and grooved boards and nail to the inside of the rings as shown in Fig. 2. Lay these tongued and grooved pieces up rather tightly, as they are meant to hold water under a little pressure, two nails each on each end. These go all the way around the inner rim.

Next make 14 water buckets as shown in Fig. 6, beveled at the tip where it cuts the water jet, and nailed with 5 nails to the backing piece. This will require 14 pieces each of 8x¾x16 inches long and 5x¾x16 inches long.

Using a scratch awl, lay off a circle 1 inch in from the outside circular rim, on the faces that are to be the inside of the wheel. Then lay off 14 spaces along these circles, with your rule, or dividers set at 12⅞ inches, which will thus divide off equally, the bucket spacing. Set the beveled tips "A" Fig. 6, on these spacing marks all around the rims, so the buckets will be correctly spaced and so the wheel will not run lopsidedly. Toe nail the buckets in the rims and see that the seat "B" comes down squarely on the ¾x3 pieces nailed inside the ring. If they do not, a little beveling at "B", Fig. 4, will make it right. Be sure that the buckets fit rather snugly in the rims, but not excessively tight.

To make the hub and arms, we first get a 1 7/16 inch flange coupling and taking it

for the FARM STREAM

apart, use half for each hub. Now get two discs of boiler iron or scrap sheet steel and have a 2 inch rough hole burned in the center of each disc. These discs should be ¼ inch thick by 15 inches in diameter, shown in Fig. 4. They can be cut sufficiently round with the welder's cutting torch. Mark off and drill the discs centrally from the holes in the coupling halves and bolt the discs fast to the coupling halves.

Have six ¼x1½ wrought iron bars each 25½ inches long welded to the discs as shown in Fig. 4, placing the arms radially on 29 inches radius. When the arms are spaced correctly around the disc, the distance apart at the tips of same, center to center, will just measure 29 inches. Punch two ½ inch holes in one end of the arms as shown for bolting the arms to the wood rims with lagscrews.

Now let us get the shaft ready. It should be of 1$\frac{7}{16}$ inch diameter, 4 ft. 6 inches long, sawed off square on each end, but not necessarily turned off.

We are now ready to bolt the arms to the wood rim and this should be done with the arms on the shaft, as in Fig. 4, so everything is lined up centrally. Using a rule, measure to see that the shaft is placed in the center of the wood rims, as this is important for good running balance. The shaft need not be key-seated, but the coupling hubs can be drilled and tapped for ½ inch setscrew in each and the cone points of the setscrews can be let into the shaft about ¼ inch after the location has been found. Now we can mark off the holes for the arm lagscrews and thus bolt the arms fast to the wood rim. Should it happen that the wheel will not turn evenly when started, we can drill new holes for the arms and plug up the old ones.

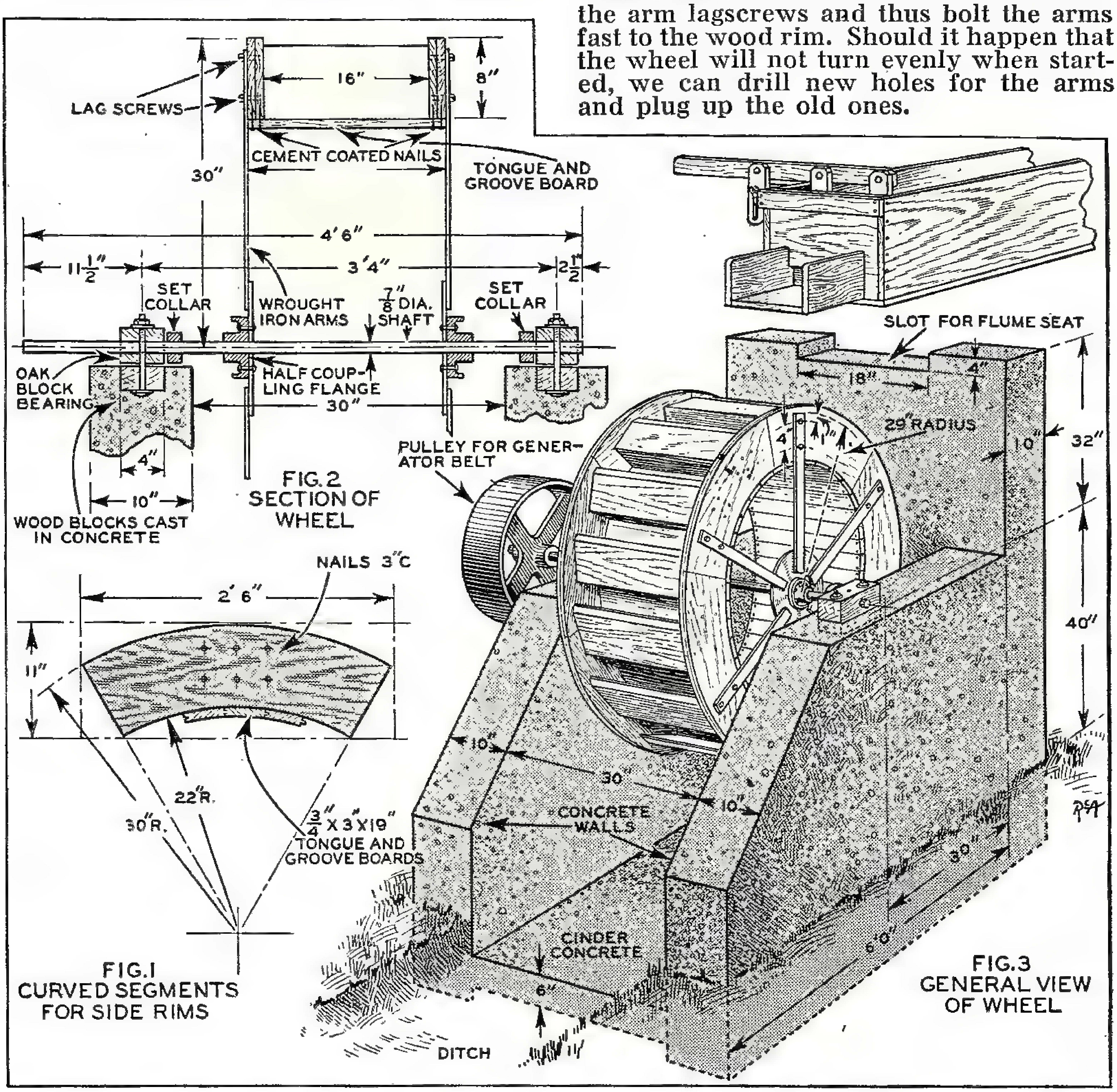

LAG SCREWS
16"
8"
30"
CEMENT COATED NAILS
TONGUE AND GROOVE BOARD
4'6"
11½"
3'4"
2½"
SET COLLAR
WROUGHT IRON ARMS
⅞" DIA. SHAFT
SET COLLAR
OAK BLOCK BEARING
HALF COUPLING FLANGE
30"
4"
10"
WOOD BLOCKS CAST IN CONCRETE
PULLEY FOR GENERATOR BELT
NAILS 3"C
2' 6"
11"
22"R.
30"R.
¾" x 3" x 19" TONGUE AND GROOVE BOARDS
SLOT FOR FLUME SEAT
18"
4"
29" RADIUS
4"
1"
10"
32"
40"
10"
30"
10"
CONCRETE WALLS
CINDER CONCRETE
6"
30"
6'0"
DITCH

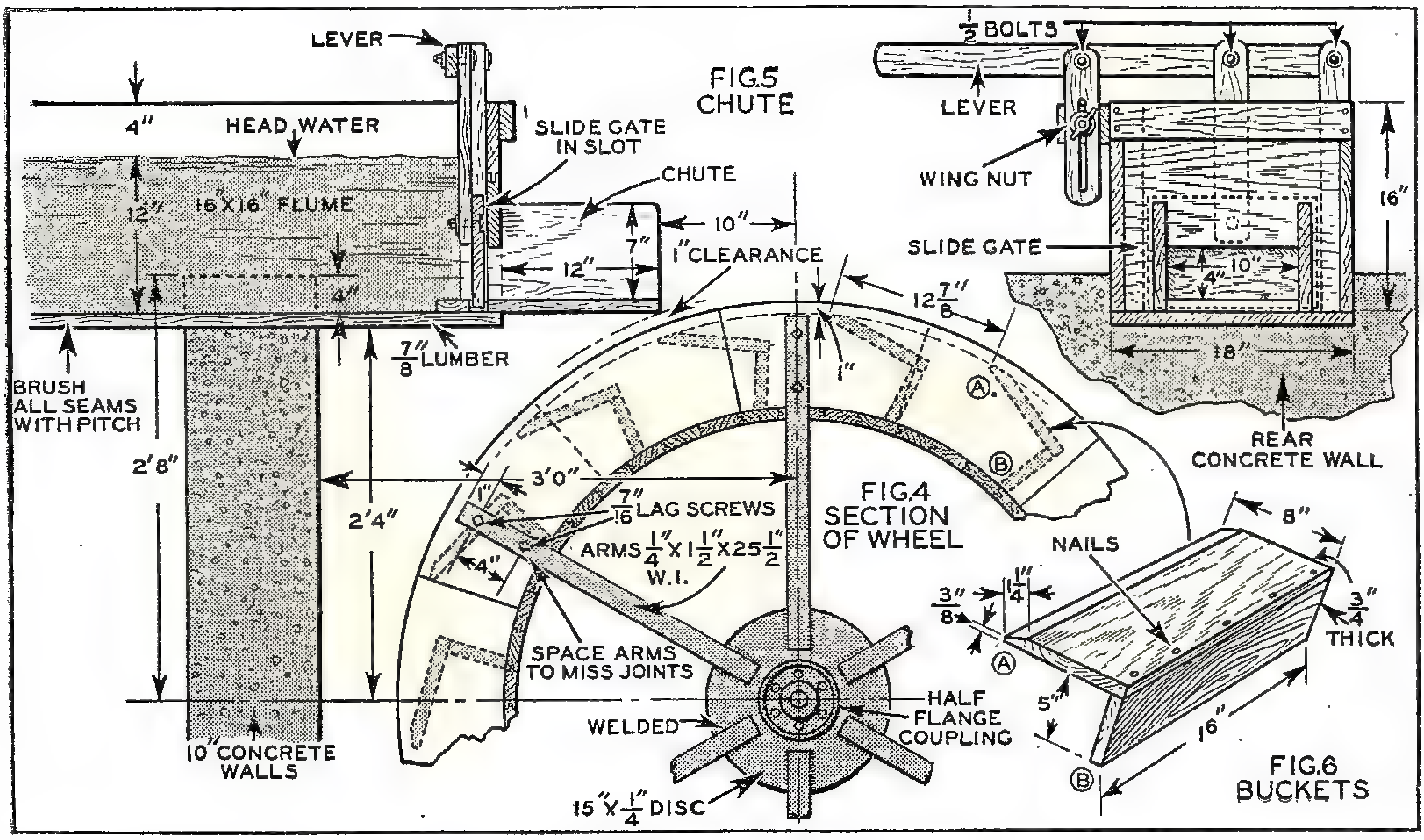
FIG. 2 SECTION OF WHEEL

FIG. 1 CURVED SEGMENTS FOR SIDE RIMS

FIG. 3 GENERAL VIEW OF WHEEL

Curved segments, 24 in number, are used in the construction of the wheel as shown in Fig. 1. The centerline of the wheel is 40" above the run-off water to get good clearance without sacrifice of head. Fig. 3 shows the concrete spillway.

Plant Like This Supplies Current for Farm at Original Cost of Only $65!


LEVER
4"
HEAD WATER
SLIDE GATE IN SLOT
FIG.5 CHUTE
CHUTE
12"
16"X16" FLUME
7"
12"
10"
1" CLEARANCE
4"
7/8" LUMBER
BRUSH ALL SEAMS WITH PITCH
2'8"
2'4"
3'0"
1"
7/16" LAG SCREWS
ARMS 1/4"X1 1/2"X25 1/2" W.I.
4"
SPACE ARMS TO MISS JOINTS
WELDED
10" CONCRETE WALLS
15"X1/4" DISC
HALF FLANGE COUPLING
12 7/8"
1"
A
B
FIG.4 SECTION OF WHEEL
1/2 BOLTS
LEVER
WING NUT
SLIDE GATE
16"
4"
10"
18"
REAR CONCRETE WALL
NAILS
8"
3/8"
1/4"
3/4" THICK
A
5"
16"
B
FIG.6 BUCKETS

To the left above is shown the flume construction, and the gate for the spillway. Right lower view shows the method of beveling the bucket. Center shows the method of making the strap iron web spokes. Bearings can be oak blocks.

For bearings, if economy of costs are very important, you can use oak blocks drilled for the shaft hole, and then bore a ½ inch grease hole thru the top for lubrication. These oak blocks should be 4 inches wide. Iron bearings can be often bought second hand and what we need here is what the trade calls solid journal bearings, babbitted. To keep the wheel from moving sideways use two set collars, one on each bearing, opposed. They can be bought cheaply solid, or in halves. See Fig. 2.

Placing Wheel in Pit

Now we are ready to place the wheel in its pit, which we can make up of 10 inch concrete walls as shown in Fig. 3. We will bolt the iron bearings to wood blocks cast into the concrete walls, having carefully leveled the top of the blocks. The bottom of the wheel should not run in the water, but should be about 10 inches above the runoff water level, so that the center of the shaft will be about 40 inches above the runoff water level.

Bring the water to the wheel thru a 16x16 square box wooden flume or a 16 inch steel pipe and end up at the wheel as shown in Fig. 5 with a gate box. The water chute should be 4 inches high and 10 inches wide horizontally. The gate should be of wood, at least 1 inch smoothed plank, 8 inches wide and 14 inches long. It should work in a slot and be raised with a lever and wooden connecting piece. To regulate the speed, you can prop the lever in such a way so that the gate will not move; in any convenient way.

To connect to the generator, belting will be the cheapest. Arrange the pulleys so the wheel will run at its proper speed, 25 revolutions per minute and using two steps you can easily get up to the generator speed. Using two pulleys on the wheel shaft, one can be for the pump and the other for the generator, by merely changing belts. You can get small water pumps so cheaply nowadays, particularly those of the Myers make, with pulleys complete, that it hardly pays to get a second hand pump. The generator can be located in some used machinery shop and it will probably be best to use 115 volt current as all house utensils are made for that voltage. Direct current compound wound machines are best for this use.

Typical Installation Cost $65

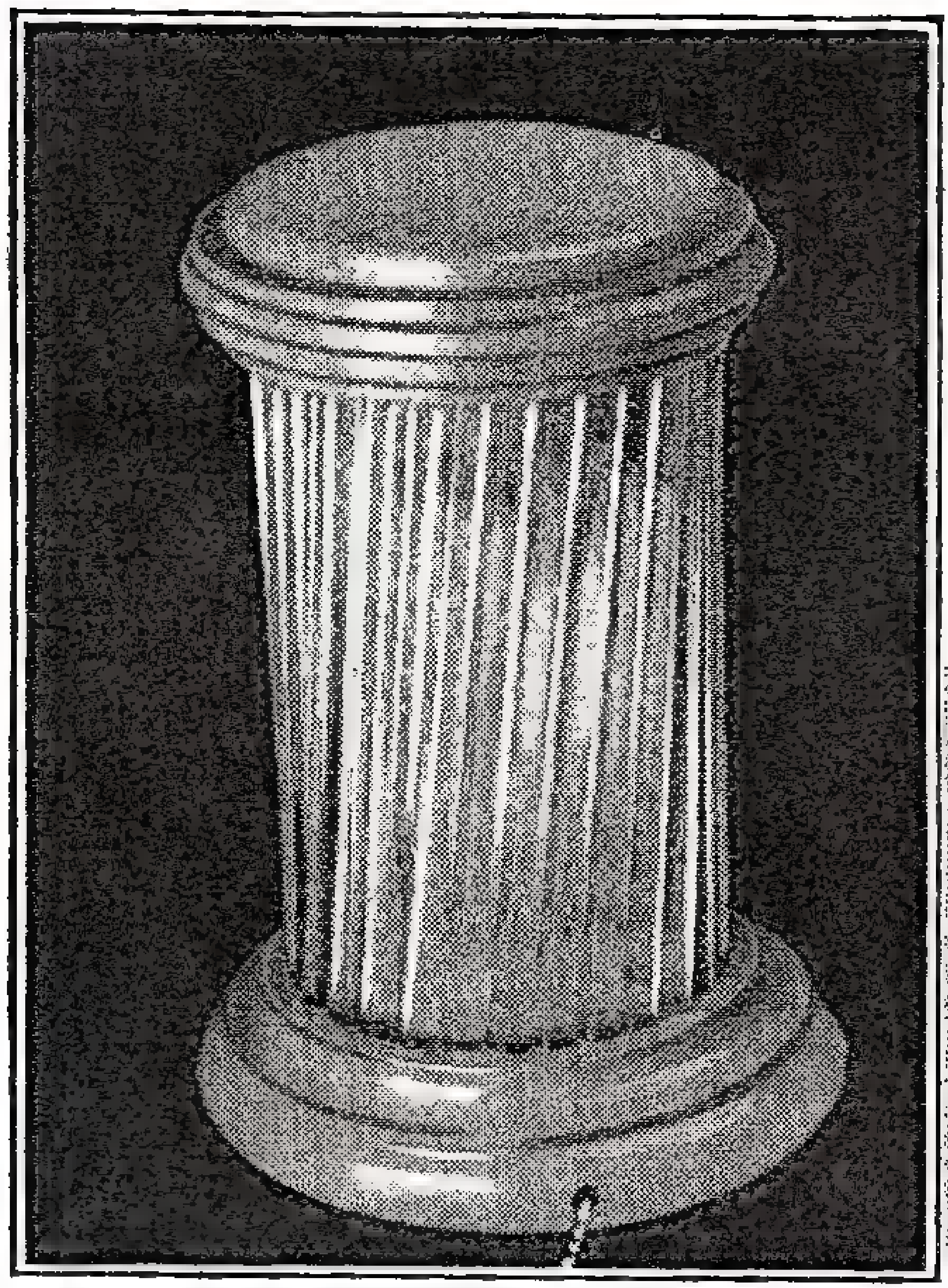
A man in my part of the country made his wheel, bought the generator, wired his house and farm complete for $65. He leaves his lights on all day so the wheel runs at steady speed. He milks his cows, pumps water, has lights and current for the toaster, sweeper and icebox; all by electricity and while it's not a show plant, he wouldn't take $5000 for the plant.

A very fine rustic effect can be obtained by covering the wood rims with hemlock bark and wiring pieces of bark to the arms. A heavy coat of pitch will preserve the wood for years. A little "dog house" built over the generator and pump will save it from the effects of the weather.

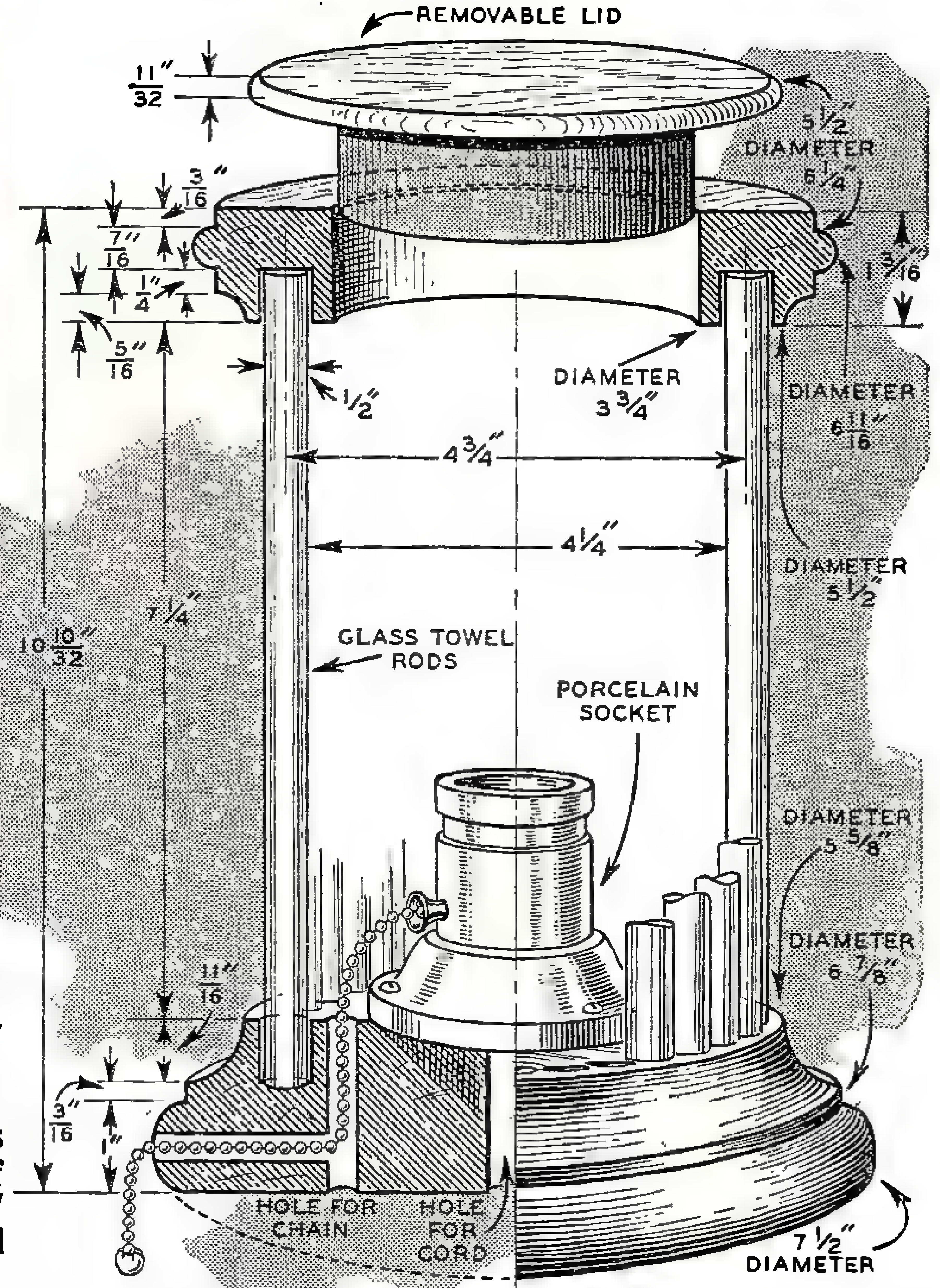
This type of wheel is called the overshot wheel, and is more efficient than the undershot wheel, other things being equal, and is easier to build.

(Continued on page 142)

Distinctive Lamp Has Glass Rod Sides



Possessing a unique distinction, the towel rod lamp is an inexpensive ornament for the living room. If the rods do not fit tightly twist the top slightly to obtain the spiral effect shown above. The pull chain comes out the side, likewise the 110-volt cord.



Turn out top, bottom and lid to dimensions shown. Cord is brought down through hole, and out to side in a groove. Fill the rod grooves in top and bottom with putty to make sides substantial.

GLASS rods form the shade of this lamp. Such rods, in the form of towel racks ½ in. in diameter and 17 in. long, are obtainable at any five and dime store.

To cut the rods to length, rest the ends on a flat iron or other anvil and chip away the flange with a cold chisel. When all ends are roughed in this way, grind the corners to diameter, and cut them through the centers.

Turn the base in a single piece, mounting a 7¾-in. piece of rough 2-in. hardwood on a face plate. Shape the profile, sand, and turn the groove for the rods. Remove the base, smooth the bottom, and bore a center hole for the cord.

Turn the top ring with the inside against the face plate and when turning the lid be sure to make it small enough to enter the ring without binding.

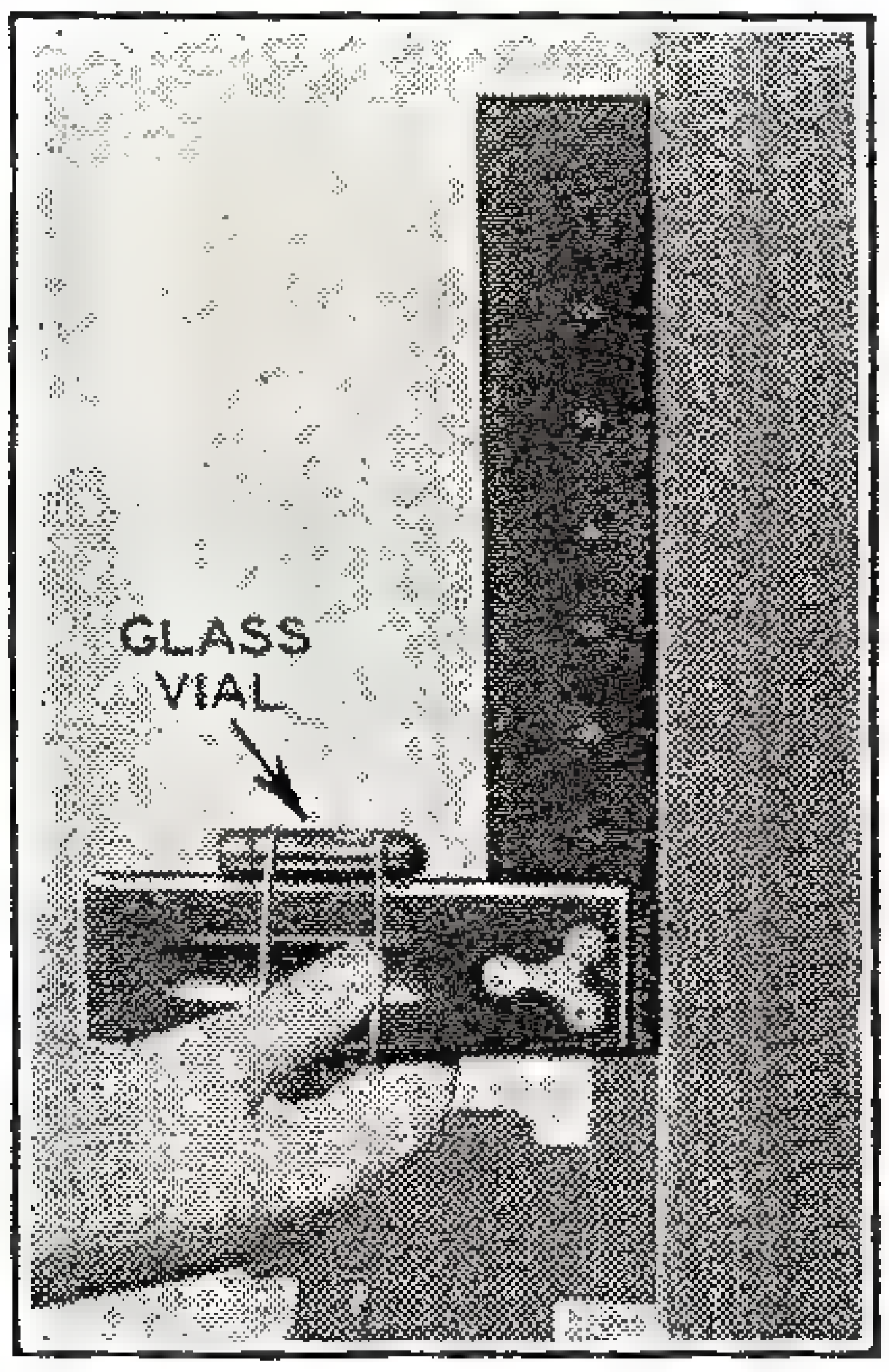
To assemble the lamp, stand twenty-nine rods in the base groove. Then enter one or two in the top-ring groove, sloping the ring toward this point. It is easy to enter the other rods, one at a time, holding them with the thumb outside and the fingers inside. When all are in, press the ring down. Fill the grooves outside, between the rods, with wood putty.

To keep the socket and bulb from showing through the glass, crumple cellophane and tamp loosely in space within the shade.

The color of the woodwork should suit the room it is to be used in. Black or jade green is good. Use a sixty-watt frosted light bulb.

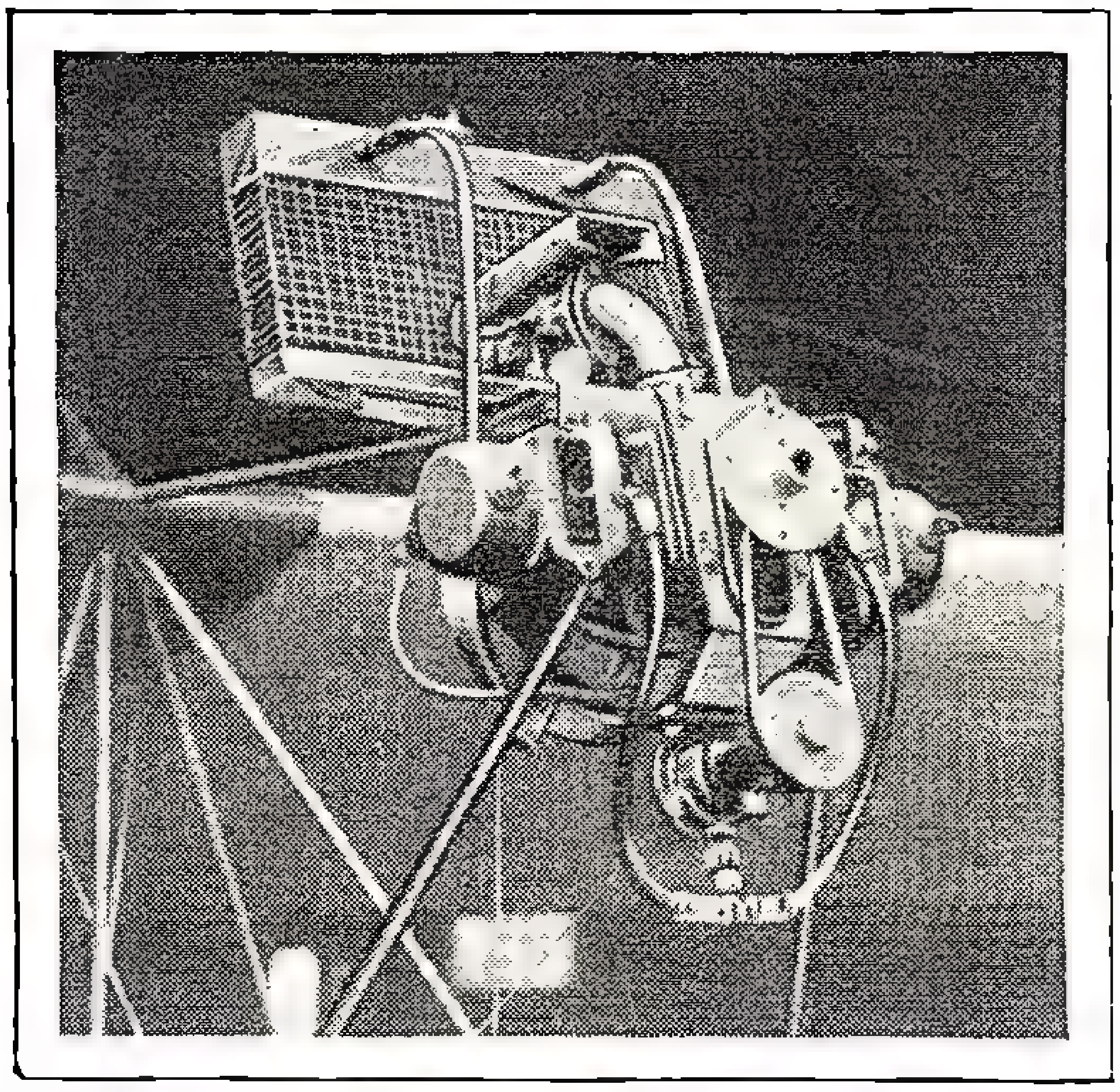
Spirit Level and Square in One

VERTICAL as well as horizontal beams may be trued with this improvised spirit level that is constructed from a carpenter's square and a small 1¼-inch bottle. Fill the bottle with colored water, cork it tightly, allowing a small air bubble, and secure the bottle to the handle of the square with rubber bands. When measuring a vertical beam the blade of the square is merely held against the beam as illustrated in the photo. If the square is to be used for checking a right angle the bottle is easily removed. Of course, the beam is true when bubble is centered.



Rubber band holds vial in place.

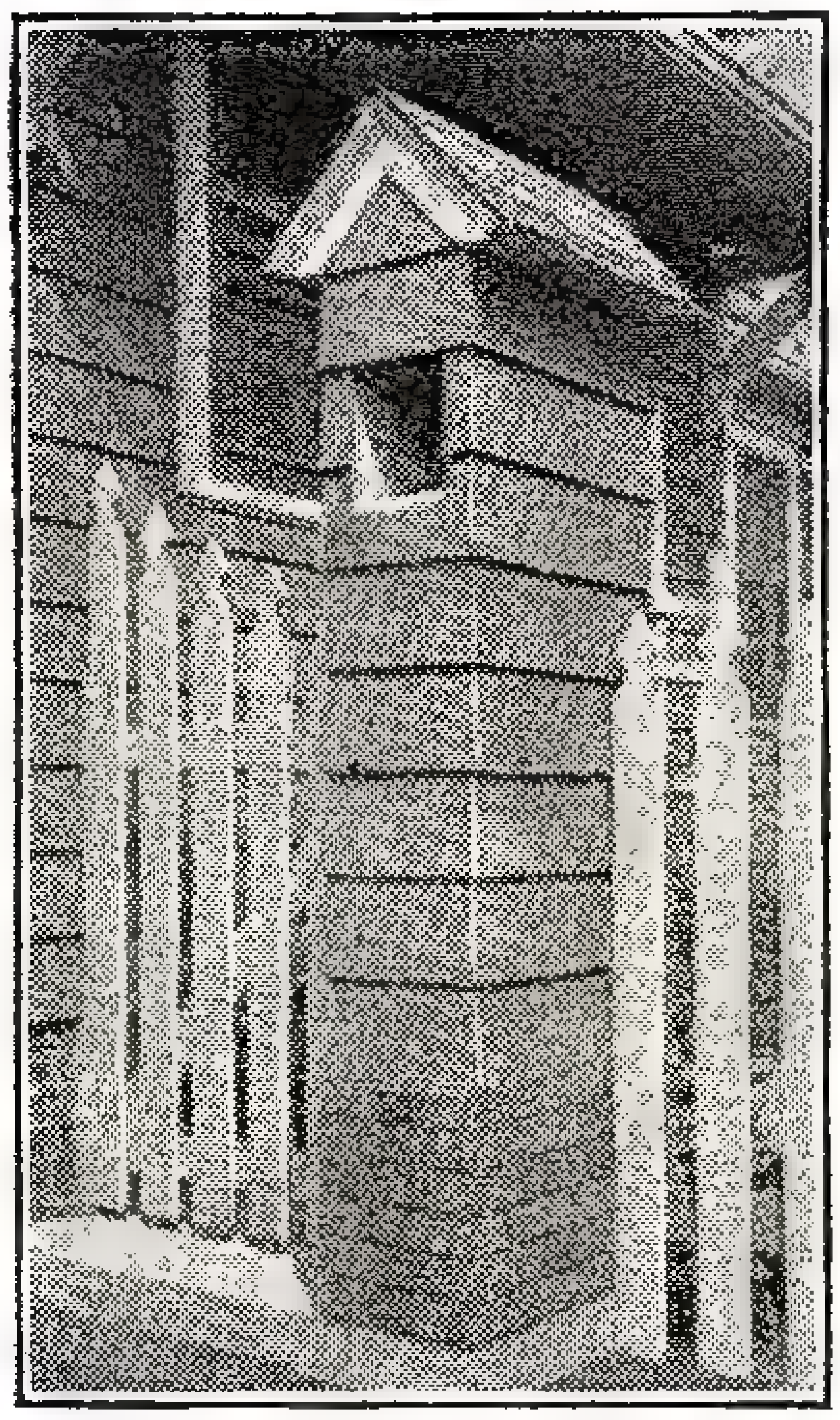
Ways of Doing It: Engine, Mail Box and Blow Torch



Recognize it? The power head of an Evinrude 16 has been furnished with a radiator and a centrifugal pump and a propeller boss. It flies a lightplane very nicely.

THREE novel kinx have come our way that deserve a page all their own. One was spotted at a Chicago airport, another was seen in a home in Detroit, and the other was tendered by a reader.

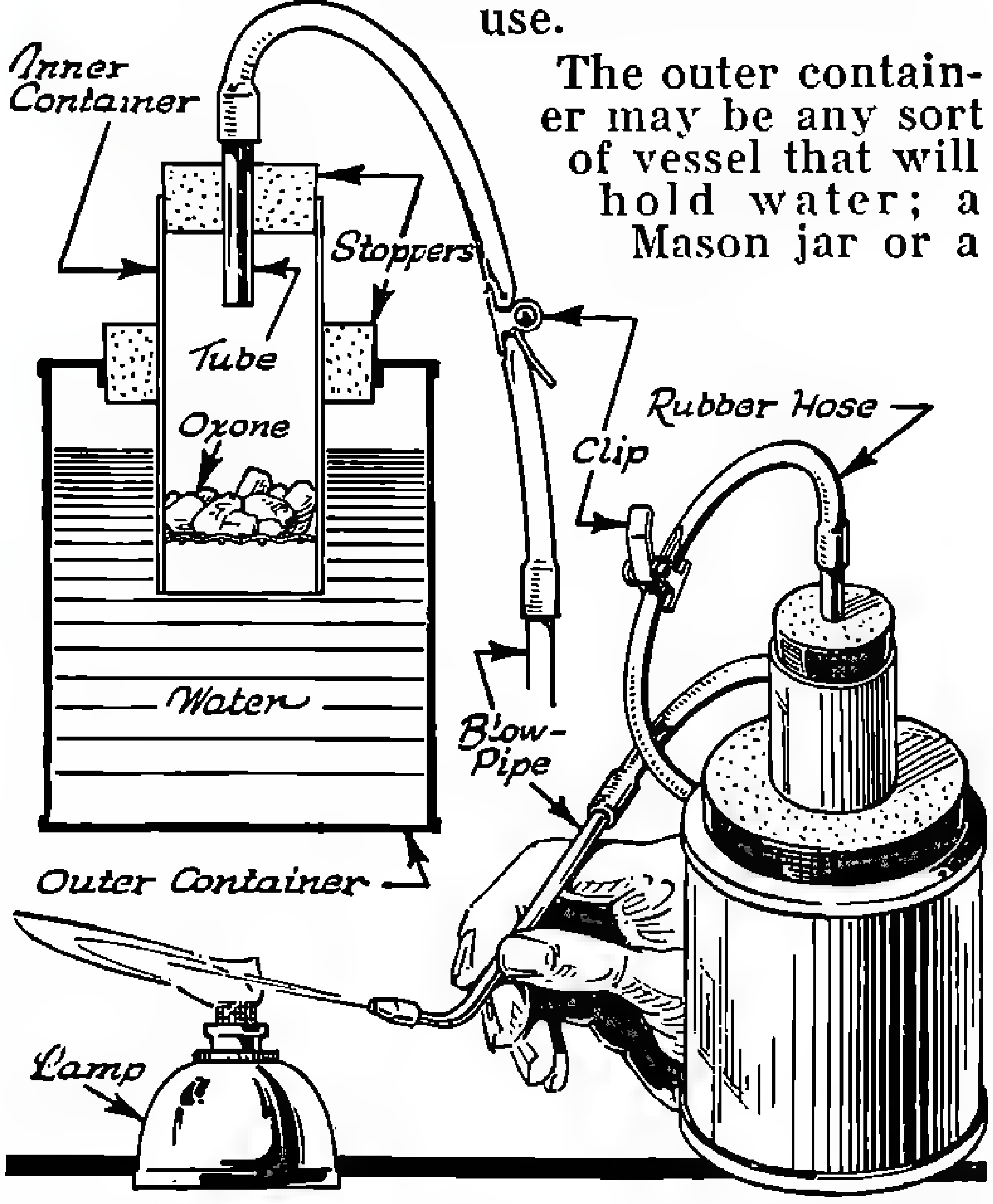
In seeking a motor for the lightplane which they had built, two Oak Park lads took the power head from an old Evinrude 16. They had in this motor the roller bearings needed for thrust bearings, and all that remained was to build a gooseneck to keep the carburetor in its original position and to build a bracket on which could be mounted a centrifugal pump of the kind you buy in supply stores to cool model T Ford cars with. The hook-up worked well. Above is shown the method of mounting. The procedure generally in use by home owners in keeping their lawns clean is to let the wind do it. A Detroit residence owner built a little shingled post, hollow, in which he deposits papers and refuse he finds about his lawn as he returns in the evening. Every so often he has a bonfire, and the lawn is kept neat with a minimum of nursing.



Above photo shows a refuse collector for the yard made to match the architecture of the house

Now for the blowpipe kink. It very often happens that a very hot flame is needed in the workshop for a short period of time for welding, melting, etc. In such cases the apparatus about to be described will do very nicely. It is merely the old-time chemical laboratory gas generator adapted for use in supplying a stream of oxygen to the ordinary blowpipe frame, and thus turning it into an oxy-hydrocarbon flame for your shop use.

The outer container may be any sort of vessel that will hold water; a Mason jar or a tin can of any sort. The top of this is closed with a plug, of wood, cork, or even plaster of Paris may be used. This plug has a hole in the center to admit the inner tube or container, which holds the "oxygen cubes" commercially called "oxone."



An oxy-hydrocarbon flame for generating extreme heat for short periods as in the melting or welding of metals can be made in your own shop in the style shown above.

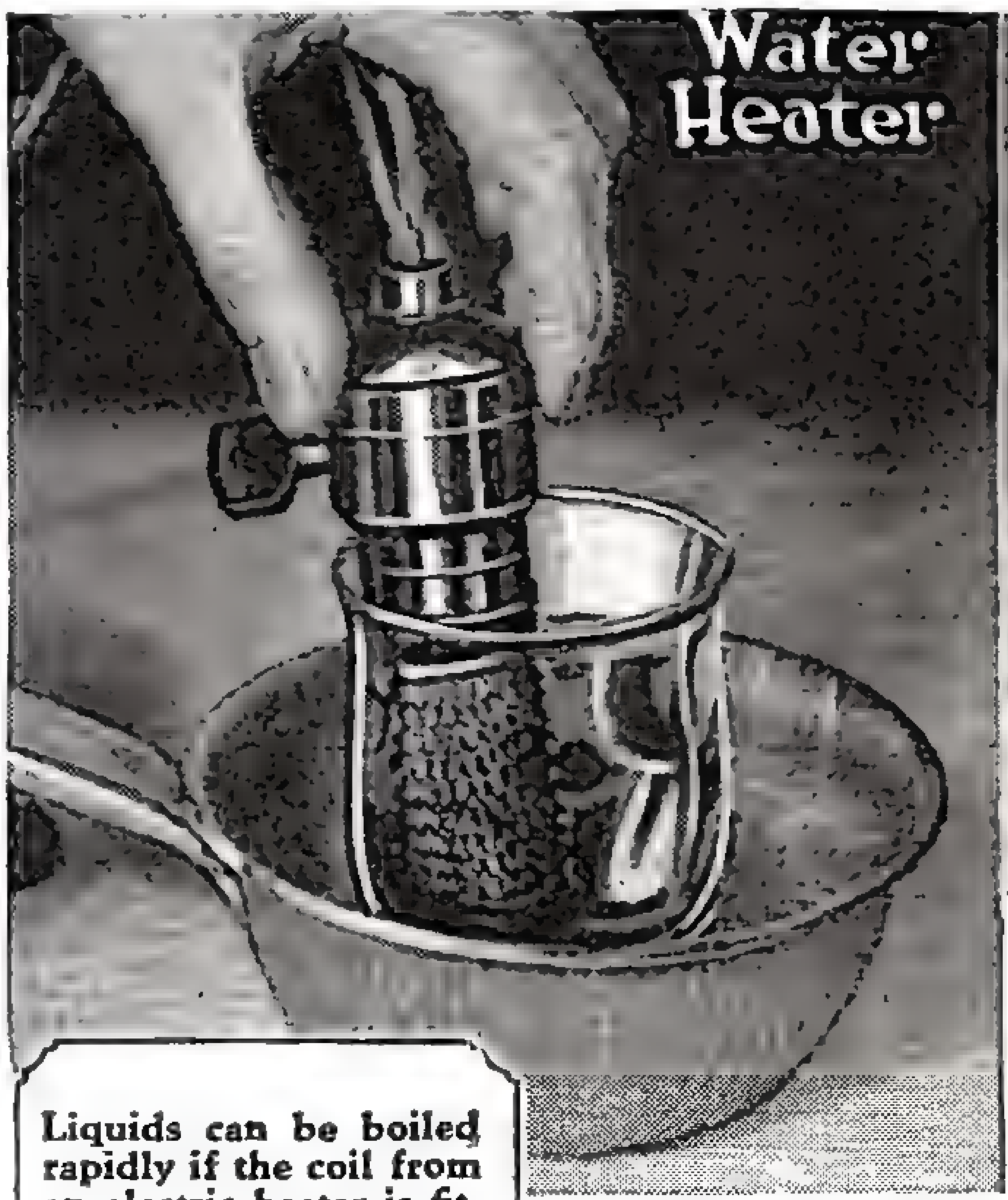
About 1 in. from the lower end of the inner tube is placed a disc cut from screen wire, slightly larger than the inside diameter of the tube, so that the edge may be bent over, holding the disc in position by pressure.

A piece of metal tubing is run through the plug of the inner container; a length of rubber tubing and a stop clip, such as used on fountain syringes and obtainable at any drug store, and a common jewelers' blowpipe, complete the list of materials.

In operation, the outer container is filled about halfway with water, and the plug is replaced. The plug of the inner tube is removed and some lumps of oxone dropped on the wire screen. Then, first making sure that the spring clip on the rubber tube is closed, so that no air can pass through, the inner tube is put in position. When the spring clip is opened, water flows up into the inner tube, reaches the oxone and generates oxygen with sufficient pressure to be used as a blowpipe stream.

It Pays to Know These Stunts

Water Heater

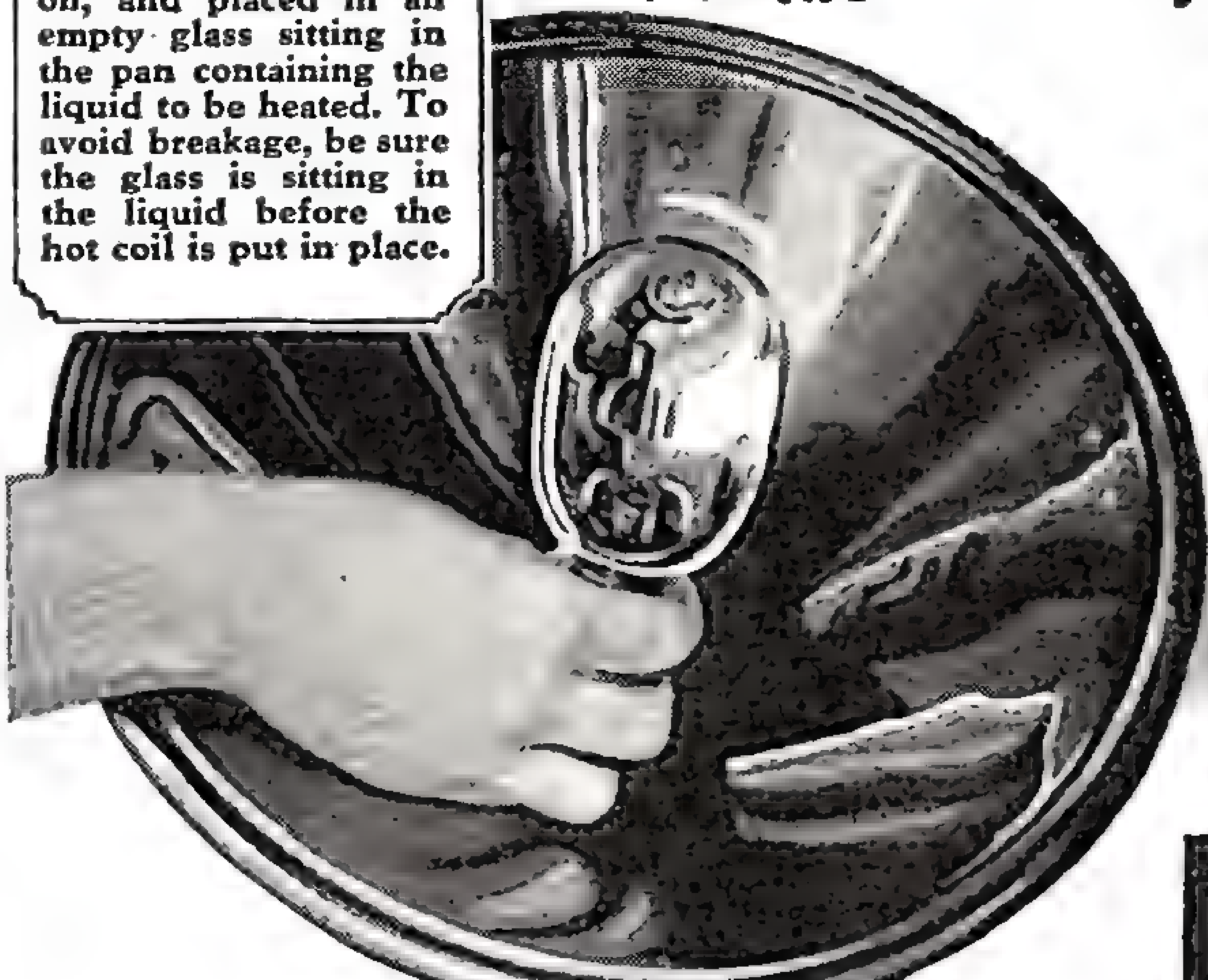


Liquids can be boiled rapidly if the coil from an electric heater is fitted in a socket, turned on, and placed in an empty glass sitting in the pan containing the liquid to be heated. To avoid breakage, be sure the glass is sitting in the liquid before the hot coil is put in place.

Padlock Grease

Padlocks exposed to outside moisture soon rust into uselessness. If a new lock is carefully stuffed with vaseline, forced into all the openings with a small knife, it will be practically rustproof, eliminating the possibility of its some day having to be opened with a hacksaw or a hammer and cold chisel.

Heater Unit



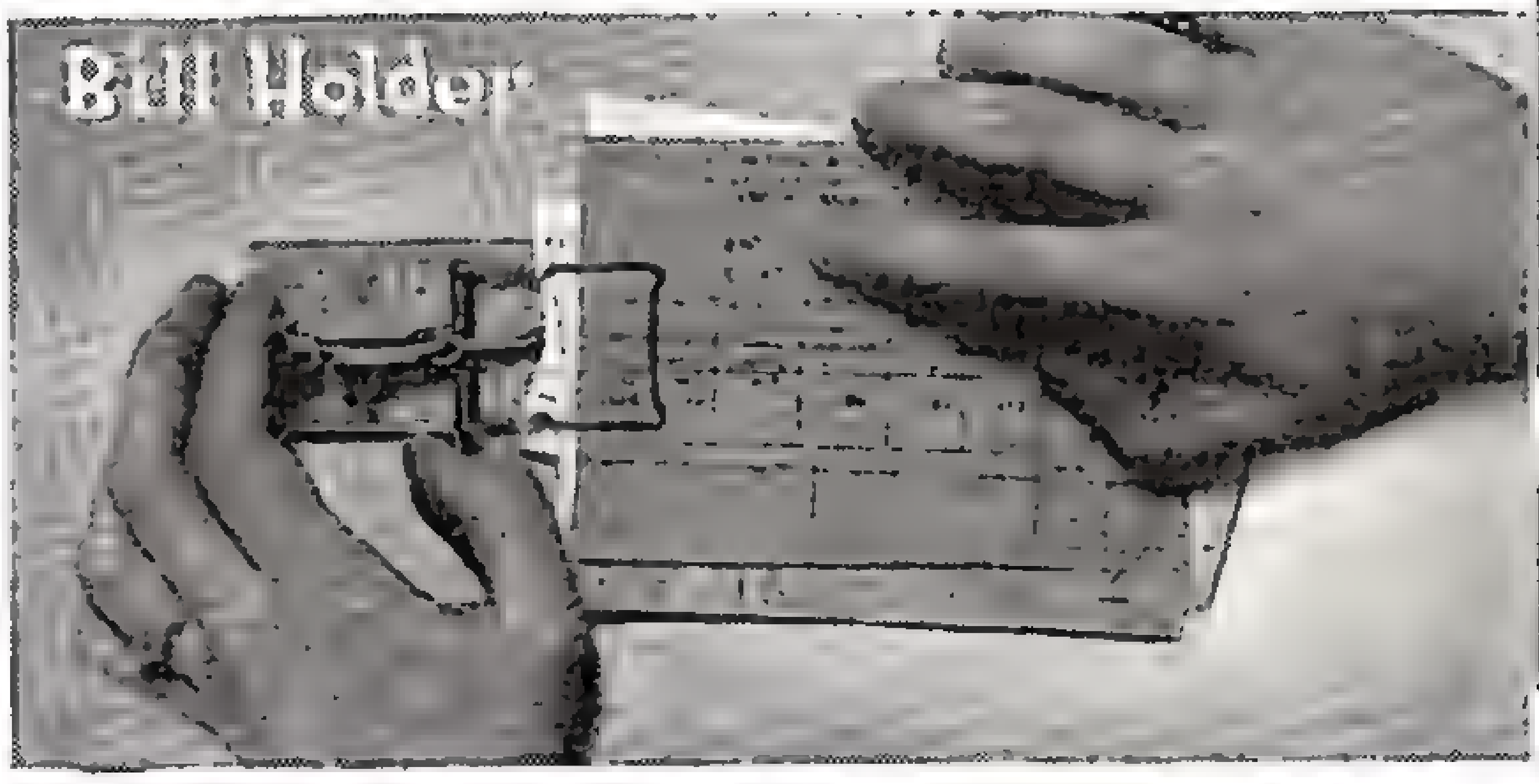
If the unit of a bowl-type heater burns out beyond repair, a 500-watt electric bulb will make a serviceable substitute, though somewhat more costly to run than the original unit.

Keeping Shoes New

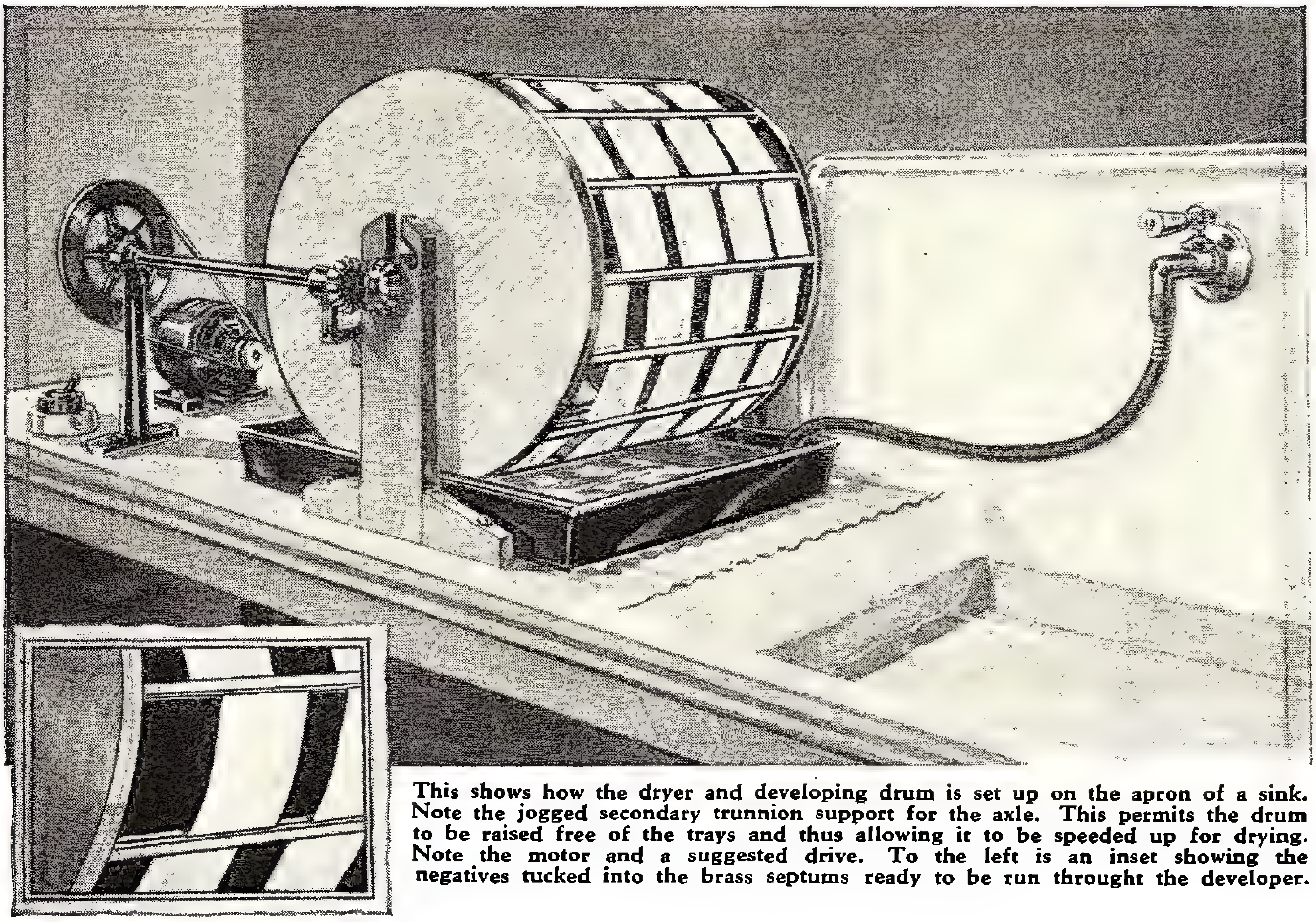
Collodion, painted on the stitches of a new pair of shoes as shown, prevents the accumulation of dirt and moisture and preserves that brand new look for many weeks. One application of collodion will last several months

Tie Presser

Bill Holder



A two-for-a-nickel mouse trap, tacked to the wall, makes a handy holder for grocery bills and other papers. A large book makes an excellent tie press when large enough to admit full length of tie when folded into sections.



This shows how the dryer and developing drum is set up on the apron of a sink. Note the jogged secondary trunnion support for the axle. This permits the drum to be raised free of the trays and thus allowing it to be speeded up for drying. Note the motor and a suggested drive. To the left is an inset showing the negatives tucked into the brass septums ready to be run throught the developer.

Labor Saving Photo Developer

by ROBERT C. QUIGLEY

THE professional photographer always has a lot of work on hand. The amateur, more and more nowadays, saves a batch of films and then does 'em all up in a hurry.

Both of these gentlemen give splendid imitations of a one-armed paper hanger caught in a high wind when they get in their dark-rooms and try to wash each print, one right after the other. Generally law and order go up the flue and hit and miss arrive with a flourish. But here's a rig that organizes a relatively large amount of work and pushes it through the soup with a delightfully progressive orderliness. The machine is at once a developing machine and a dryer.

Tray Slips Under Disk

Two wooden discs about 24" in diameter are mounted on an axle which is connected to a motor by gearing and pulleys so that the wheel will turn 78 r. p. m. on one belt and 300 r. p. m. on another.

The axle mounting is loose so that the developer tray can be slipped under it when it is raised, and successive trays of developer, water, hypo, and water can be used.

Then the drum can be raised and the high speed belt used to whirl the negatives until they are dry. The same procedure can be used for prints in their intermediary stages of drying before they become curled· and after they have dried sufficiently to be inserted in the brass septums.

These marginal septums are made from brass rod and are spaced according to the size of the cut negative. There is a small slot run into them on the milling machine. If you do not have the facilities for making these slots any machine shop will welcome the work of putting them in for you on their miller.

How the Film Is Held

The ends are flattened and screwed to the discs. The film will snap out enough to be held with sufficient rigidity in the slots while the drum is rotating.

Brass and bronze should be used for the fastenings as they are chemically inert to most of the mild acids once a salt has been formed on them similar to rust, and they do not deteriorate after that.

No formula can be given directly for the exact size of the wheel and for the exact speed. So much depends upon the element of time used to develop, wash, fix and rinse. The way to approach the determination of speeds is to equate the time normally consumed in developing to the trip time through the developing bath, working down from the speed of the motor and the pulley ratios, using a fixed motor speed of 1,750 r. p. m., which is the fixed speed of all induction motors running on 110 volts a. c. This will allow you to put in the films on one side and to take them out on the other, dropping them into the fixing bath.

Another tray can then be lined up and the wheel run with its set of prints for the right amount of time in the hypo. Then the washing can be done for a much more thorough job in less time by continuing the same speed and running in a tray of mildly circulating water.

In Use as a Dryer

When thoroughly washed, the wheel is speeded up to the figure given, 300 r. p. m., which will create a breeze on both faces of the negatives and do a good job of drying. On my machine I found that water spots due to irregular drying were done away with, and the films dried without curling, due to the evenly distributed pressure over their faces because of centrifugal force.

For a man with a lot of professional work to do such as is found in the 8-hour photo finishing service, these machines might well make the nucleus of a good business, especially in many of the smaller towns.

In that case it would be a good idea to have several drums, and load one with exposed negatives, put it in the developer, and remove the whole wheel to the fixing bath, then move the whole wheel on to the other baths, having a wheel for each of the baths if the amount of work warranted it.

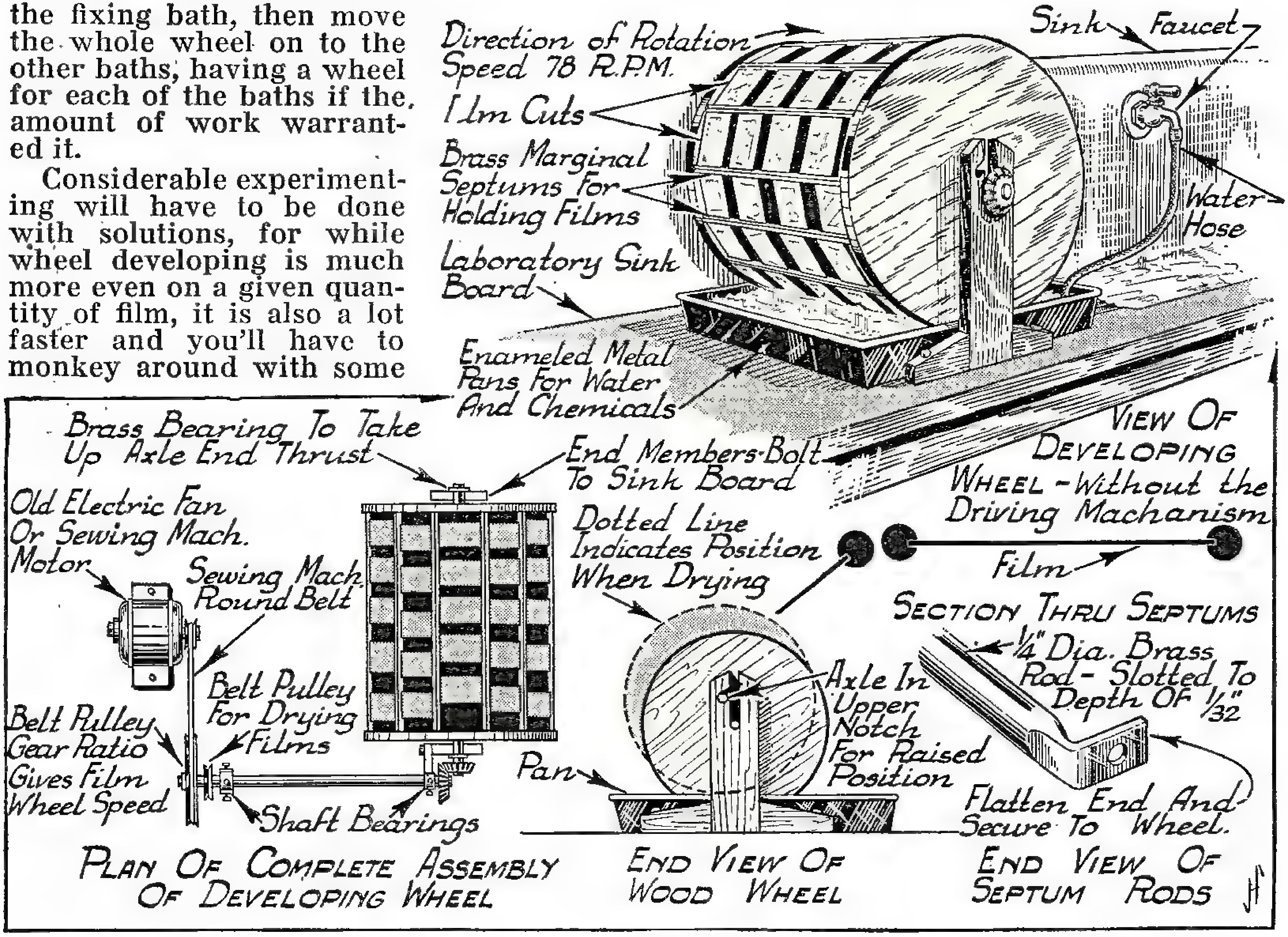
Considerable experimenting will have to be done with solutions, for while wheel developing is much more even on a given quantity of film, it is also a lot faster and you'll have to monkey around with some sample shots to find the right normalcy of solution for the most effective work.

One kink which the amateur is generally not aware of is used by professionals in drying prints. That is bathing them in alcohol briefly after they have been thoroughly washed, and then ironing them out on enamel plates with a squeegee.

The alcohol takes the water into solution, and the print then dries with only the water of inclusion and the surface alcohol remaining to be evaporated. This will give glossy prints, and if you cannot find enamel plates with the baked enamel faces like automobile mudguards look when new, you can use plate glass as effectively.

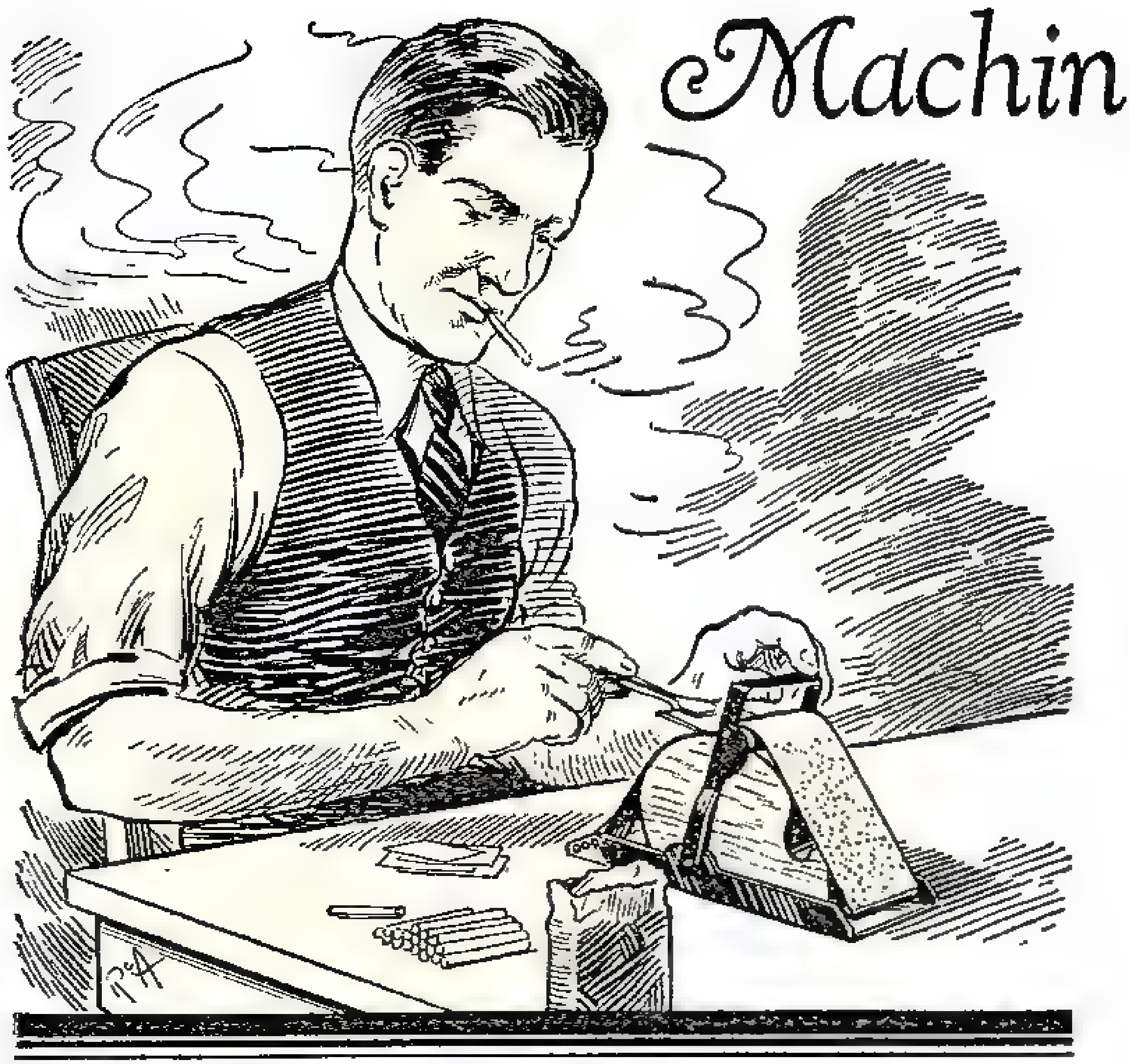
Prints after they have been partially dried in a machine like this should be press dried in blotting paper sold for the purpose by photographic supply stores.

Frequently the amateur, and the professional as well, is troubled with prints curling after drying, owing to inequalities of surface tension set up by the emulsion. Large plants have devices which run the print through a series of rollers and so remove the curl. The same effect can be secured by immersing prints for not less than five minutes, between washing and drying, in a bath composed of one part glycerin to seven parts water.


Direction of Rotation Speed 78 R.P.M.
Film Cuts
Brass Marginal Septums For Holding Films
Laboratory Sink Board
Enameled Metal Pans For Water And Chemicals
Sink
Faucet
Water Hose
View Of Developing Wheel - Without the Driving Machanism
Brass Bearing To Take Up Axle End Thrust
End Members Bolt To Sink Board
Old Electric Fan Or Sewing Mach. Motor
Sewing Mach. Round Belt
Belt Pulley For Drying Films
Belt Pulley Gear Ratio Gives Film Wheel Speed
Shaft Bearings
Plan Of Complete Assembly Of Developing Wheel
Dotted Line Indicates Position When Drying
Axle In Upper Notch For Raised Position
Pan
End View Of Wood Wheel
Film
Section Thru Septums
1/4" Dia. Brass Rod - Slotted To Depth Of 1/32"
Flatten End And Secure To Wheel.
End View Of Septum Rods

Upper right is a view showing the developing drum with tray under for washing of negatives. The cross sections show the manner of grooving used in the brass rod septums. The ends of the rods are flattened and drilled for screws to hold them to the discs. A suggested drive is shown to the lower left. Note the method of raising axle.

Machine Rolls Your Smokes



Paper placed on apron is smoothed down with blade to form a compact cigarette. Note how the handle is drawn back.

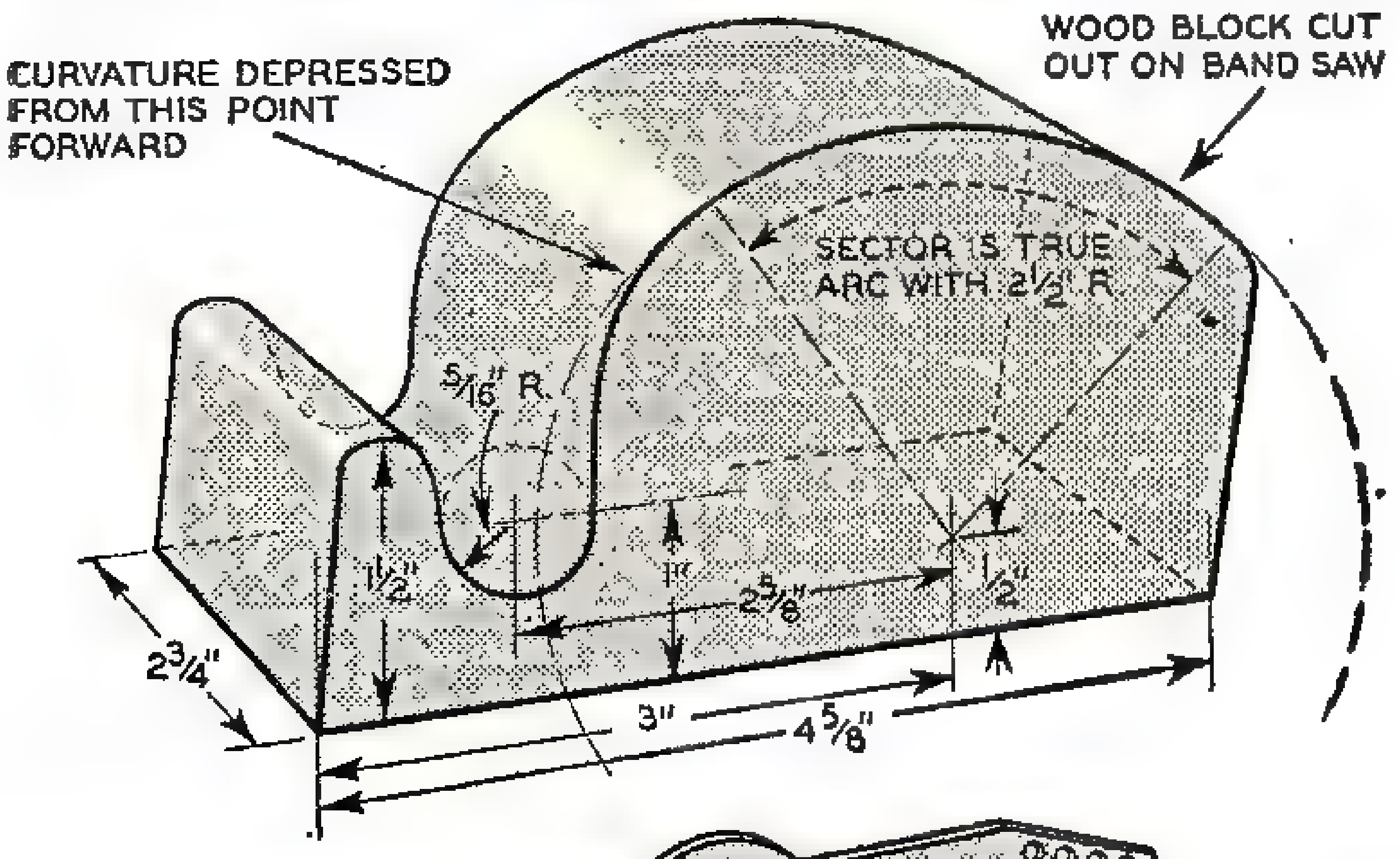
OWING to the stress of the times, many men have resorted to "rolling their own." It is a truly economical measure, because the smoker does not have to pay the exceptionally heavy tax—30 cents per 100—assessed against "tailor-made" cigarettes.

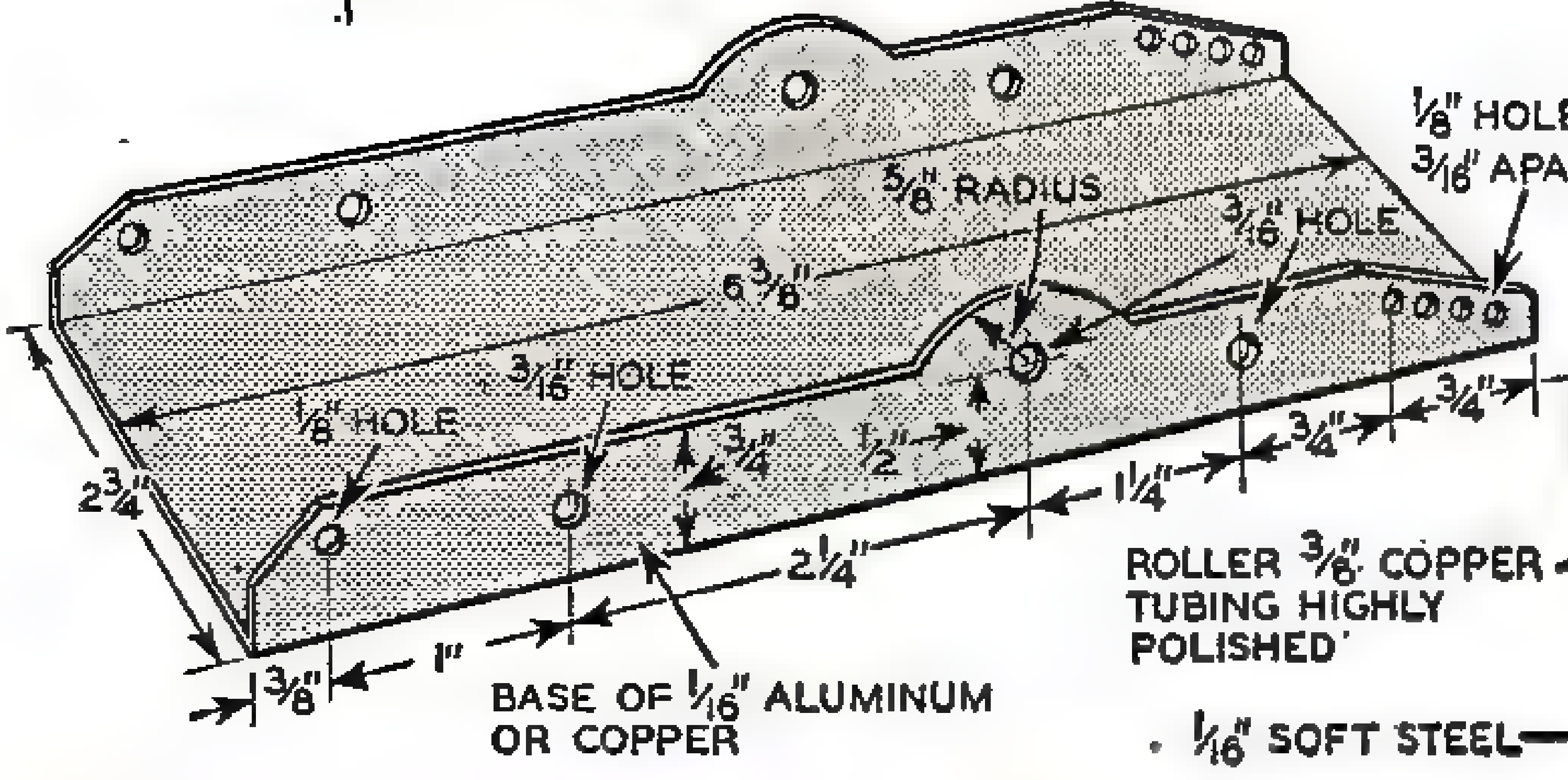
Why not make your own cigarette rolling machine? The construction is simple and material costs only a few cents. The accompanying drawings show a machine which rolls cigarettes of four different sizes: a fat cigarette for an after-dinner smoke, a conventional size, a slender cigarette and a slim one.

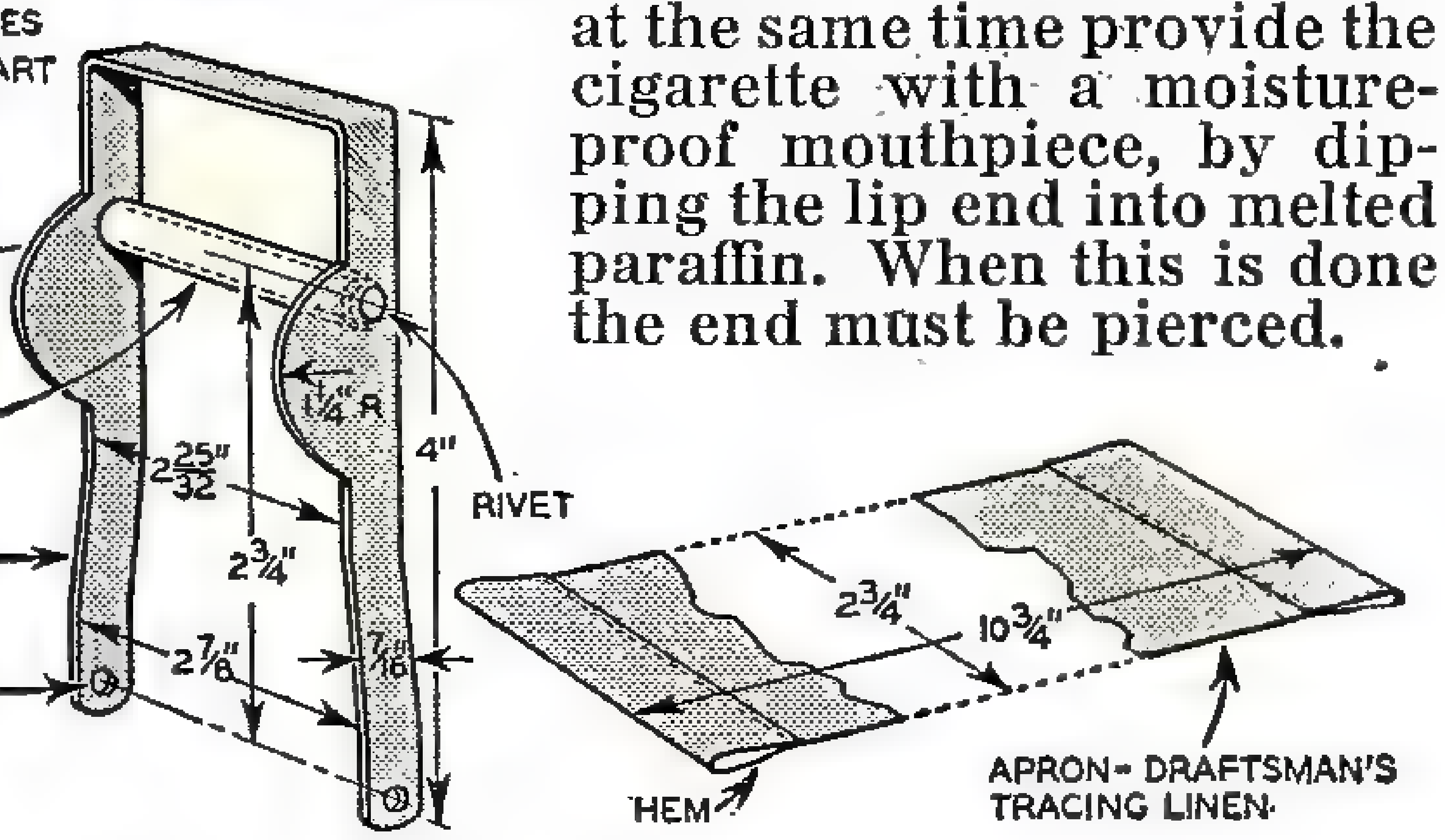
With the use of a machine, it is customary to roll a quantity of "smokes" at one time. The tobacco usually comes in a package as illustrated, and the whole is contained in a cellophane wrapper. To prevent drying, open the cellophane at the top and slip out the package. Now measure up the package the length of a cigarette and cut completely through with a sharp knife or scissors.

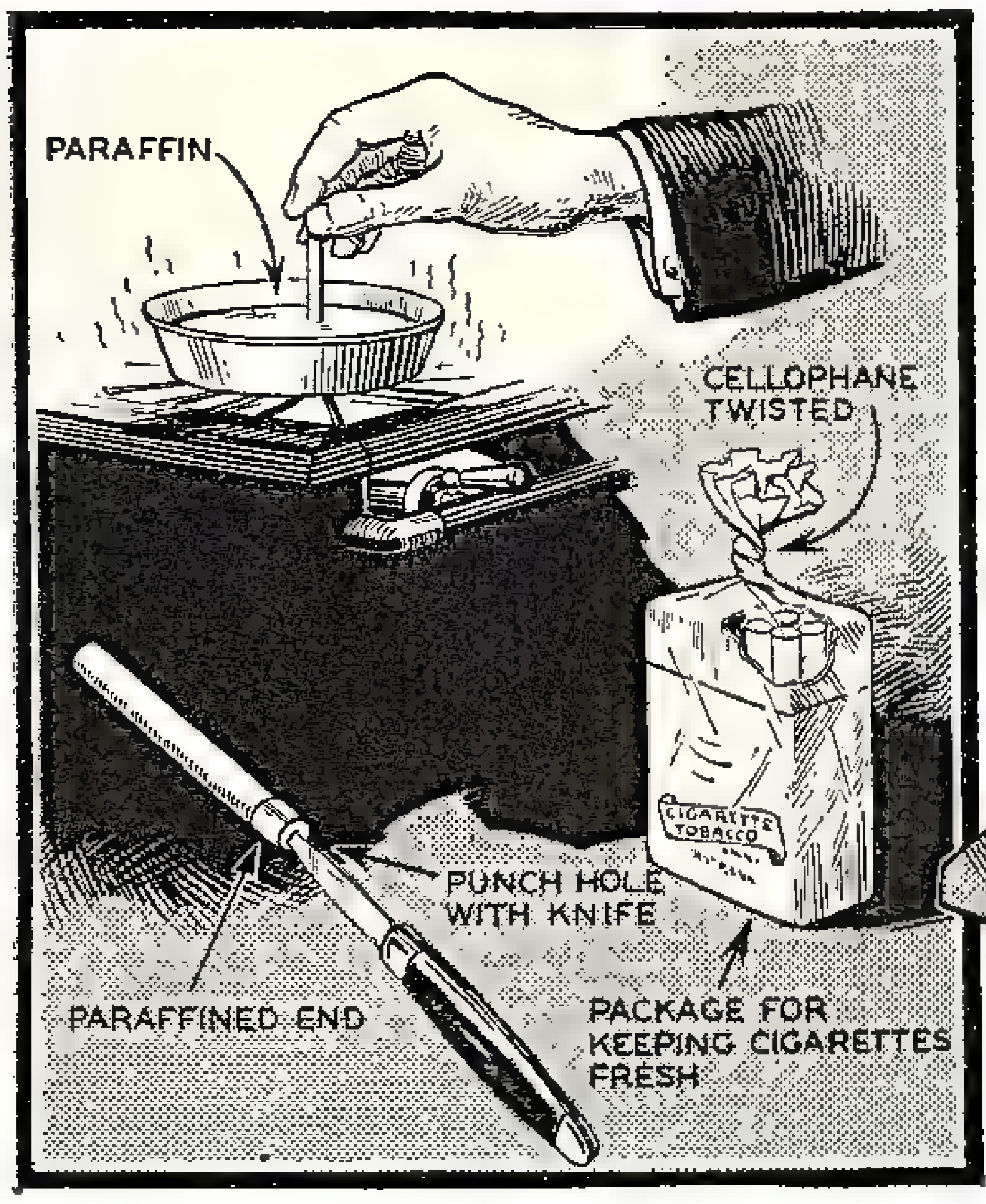
Remove the contents. After the tobacco has been converted into cigarettes, they are packed into the lower part of the package. The top part serves as a lid. The cellophane is replaced and twisted up. The cigarettes can be stored away indefinitely in this package without drying out or deteriorating.

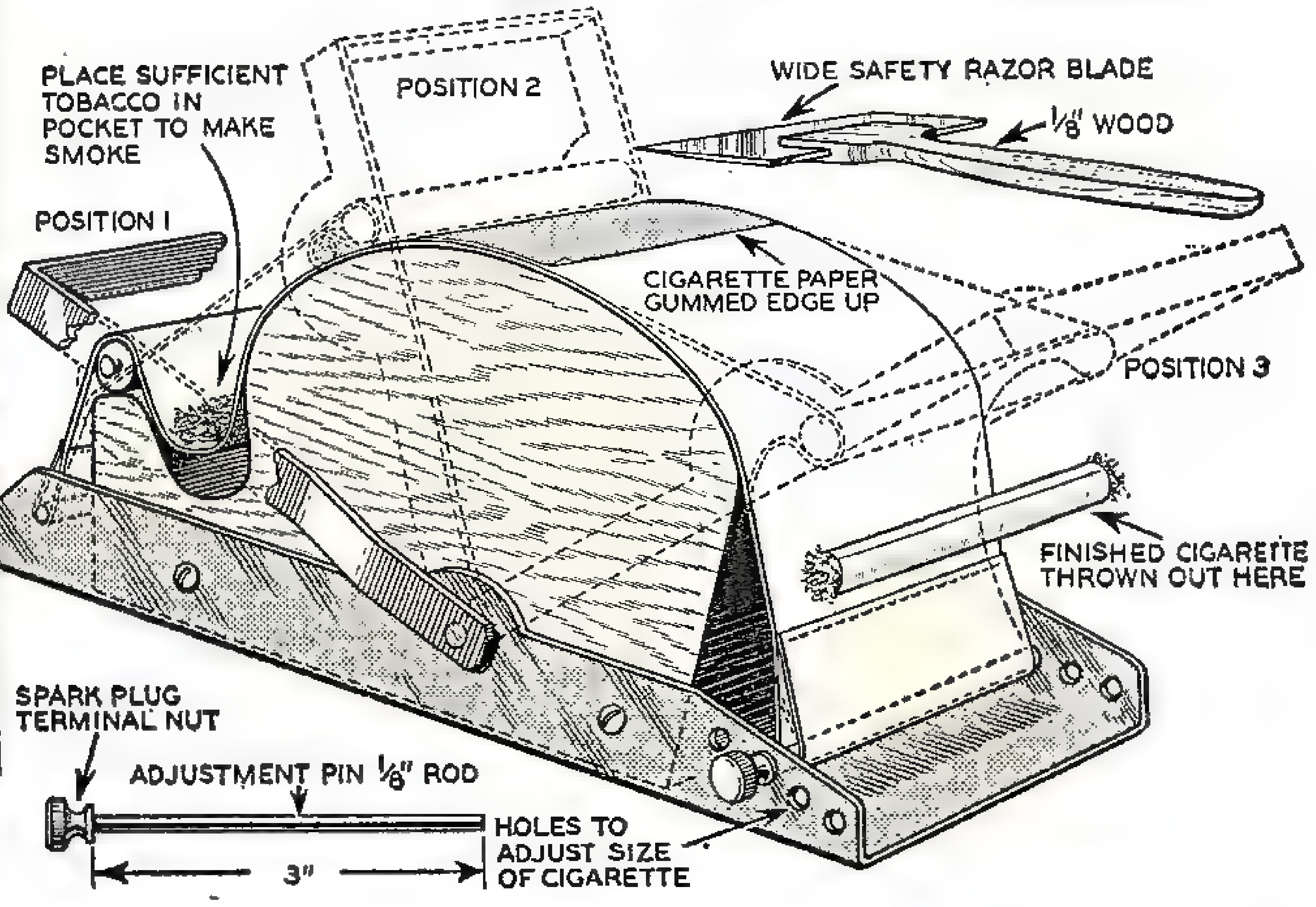
Some smokers complain that the tobacco in home-made cigarettes gets into their mouth. This difficulty can be avoided, and at the same time provide the cigarette with a moisture-proof mouthpiece, by dipping the lip end into melted paraffin. When this is done the end must be pierced.


WOOD BLOCK CUT OUT ON BAND SAW
CURVATURE DEPRESSED FROM THIS POINT FORWARD
SECTOR IS TRUE ARC WITH 2½" R.
5/16" R.
1½"
1"
2⅝"
½"
2¾"
3"
4⅝"


⅛" HOLES 3/16" APART
5/8" RADIUS
3/16" HOLE
6⅜"
⅛" HOLE
3/16" HOLE
2¾"
¾"
½"
1¼"
¾"
¾"
2¼"
⅜"
1"
BASE OF 1/16" ALUMINUM OR COPPER

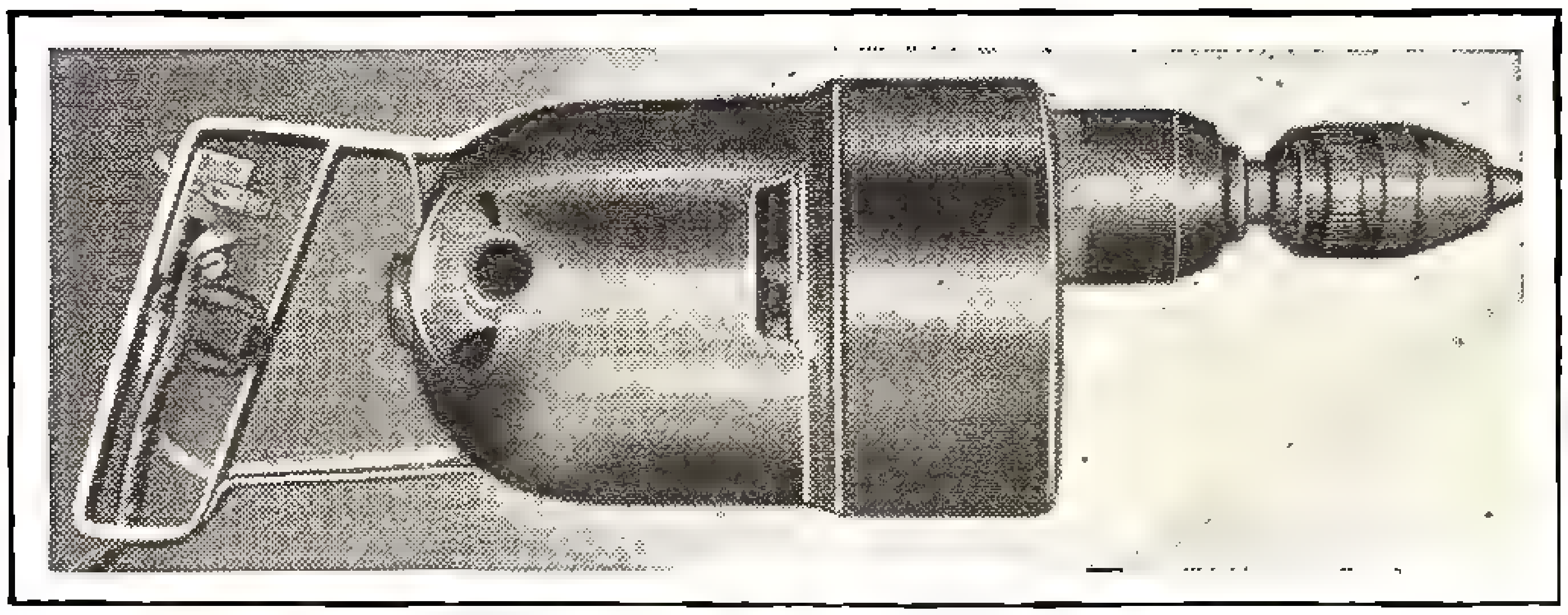

ROLLER ⅜" COPPER TUBING HIGHLY POLISHED
⅛" SOFT STEEL
3/16" HOLE
¼" R
2 25/32"
2¾"
4"
2⅞"
7/16"
RIVET
2¾"
10¾"
HEM
APRON- DRAFTSMAN'S TRACING LINEN


PARAFFIN
CELLOPHANE TWISTED
CIGARETTE TOBACCO
PUNCH HOLE WITH KNIFE
PARAFFINED END
PACKAGE FOR KEEPING CIGARETTES FRESH

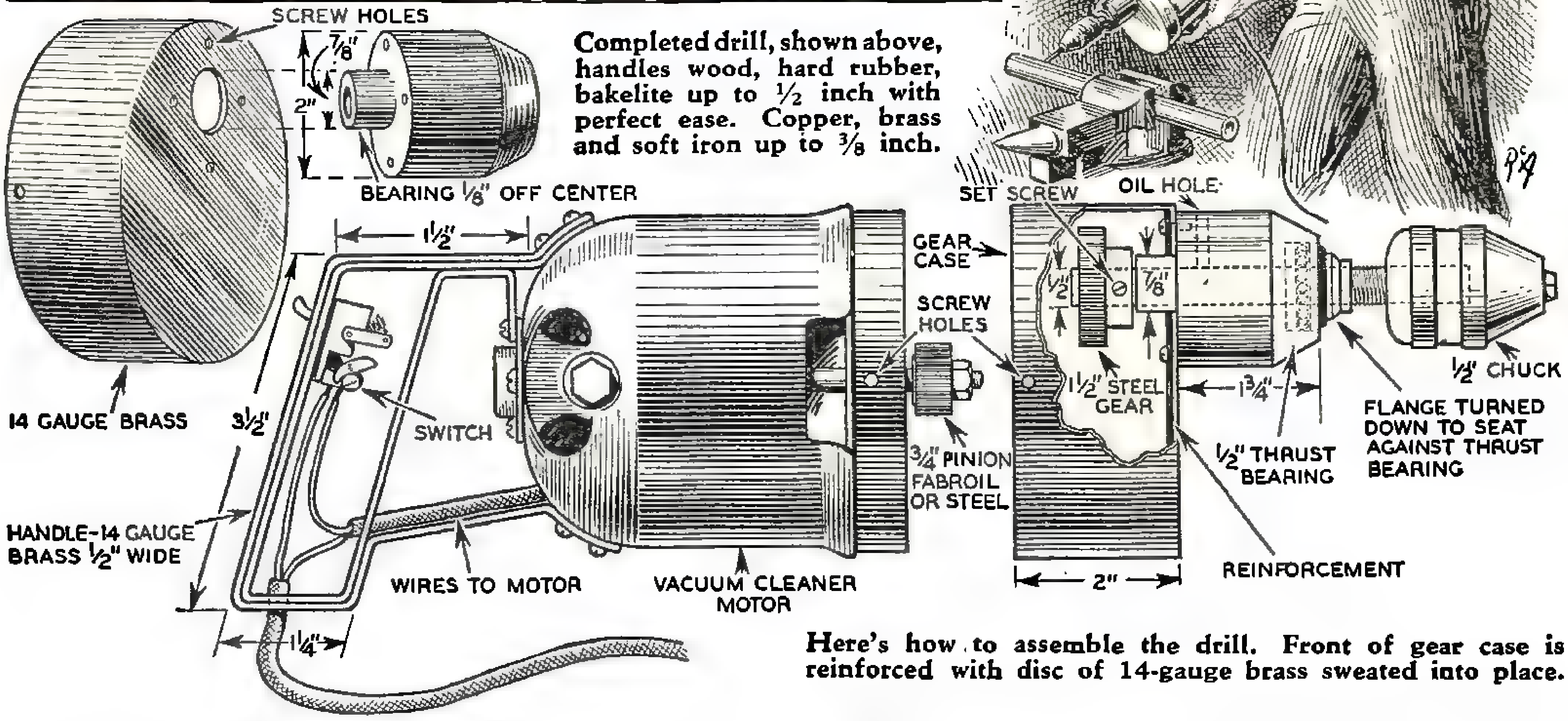

PLACE SUFFICIENT TOBACCO IN POCKET TO MAKE SMOKE
POSITION 2
WIDE SAFETY RAZOR BLADE
⅛" WOOD
POSITION 1
CIGARETTE PAPER GUMMED EDGE UP
POSITION 3
FINISHED CIGARETTE THROWN OUT HERE
SPARK PLUG TERMINAL NUT
ADJUSTMENT PIN ⅛" ROD
3"
HOLES TO ADJUST SIZE OF CIGARETTE

Make cigarette by placing tobacco in position 1. Then draw handle back to position 3 and your smoke will be delivered in rear.

Vacuum Cleaner Motor Powers Shop Drill



Completed drill, shown above, handles wood, hard rubber, bakelite up to ½ inch with perfect ease. Copper, brass and soft iron up to ⅜ inch.



Here's how to assemble the drill. Front of gear case is reinforced with disc of 14-gauge brass sweated into place.

A POWERFUL and serviceable electric drill which will handle wood, bakelite and hard rubber up to a thickness of ½ in. and brass, soft iron and copper up to ⅜ in. can be easily made from a discarded vacuum cleaner motor by anyone handy with a few tools and with access to a lathe.

Begin by overhauling the motor, cleaning it with hot water and gasoline to remove all traces of grease and dust. Then repack the bearing with hard oil and brighten the commutator with fine sandpaper. The fan should be removed from the shaft and the pinion secured firmly in place.

The gear case can be spun or soldered into shape over a hardwood form the exact size necessary to secure a snug fit over the front of the motor housing. The position of the hole for the chuck bearing can be determined by laying the pinion and gear in mesh on the front of the gear case and marking the center of the larger gear with a punch. One-sixteenth tolerance should be allowed between centers.

Now get to work on the two-inch brass stock. Shape the nose and drill the ½ in. hole for the spindle, then cut the recess for the thrust bearing. With this accomplished, the bearing is off-centered ⅛ in. and the metal cut down to ⅞ in. to provide a shoulder. By rotating the spindle bearing before it is fastened in place the proper location can be readily determined by the sound of the gears.

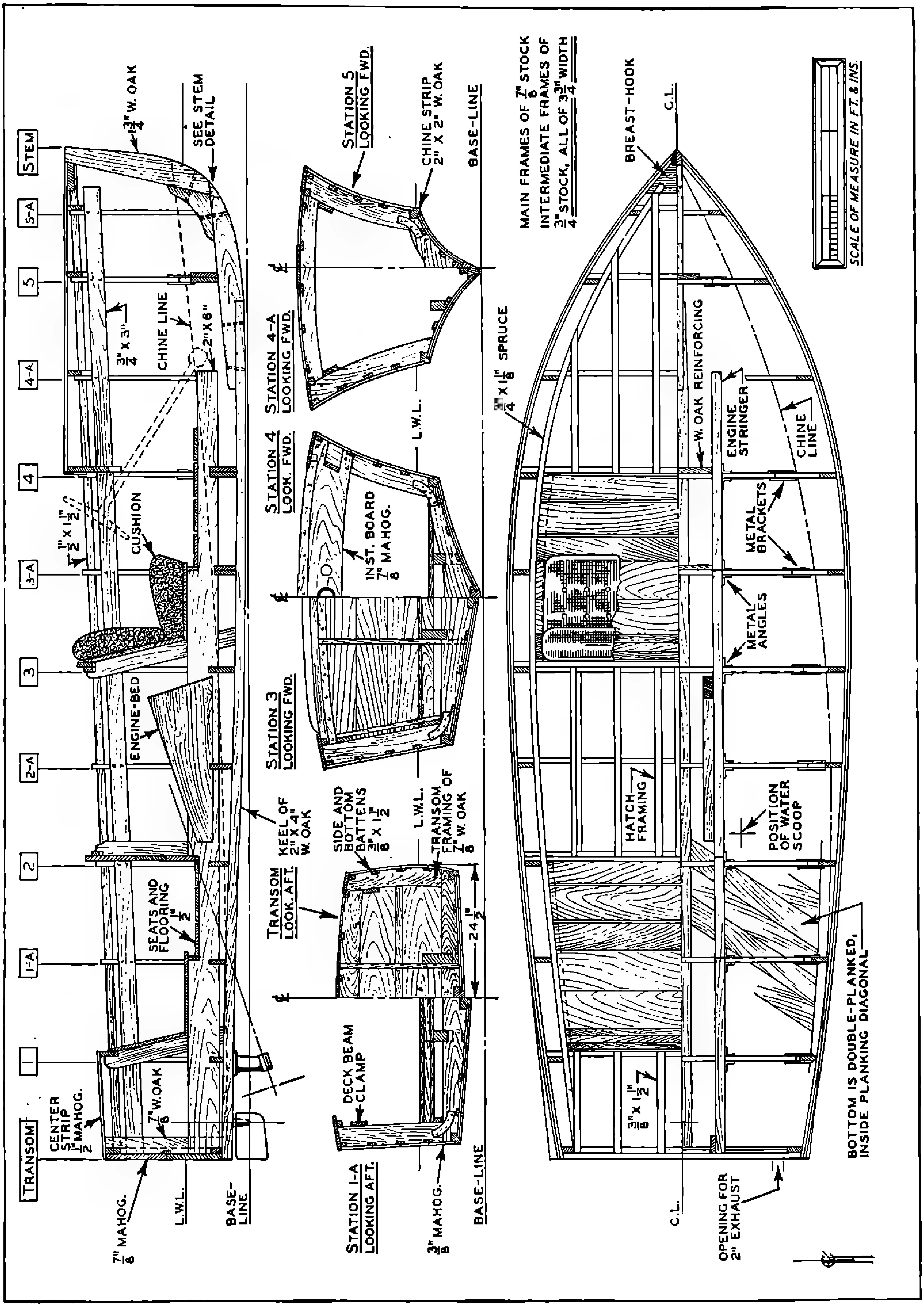
When the proper adjustment for the gears has been determined, drill the gear case and spindle bearing from the back and tap for round-headed machine screws.

The handle is bent as illustrated from 14-gauge brass strip. Sweating these brass strips together will give a handle of surprising rigidity. A tumbler switch mounted on the handle provides for easy operation of the drill. Likewise the handle is suitably drilled for the cord and leads to the motor. The handle is finally finished with two flat pieces of wood or it may be filled with plastic wood compound and covered with friction tape.

For light work and model making, it will be found advisable to insert a resistance in the line to cut down both speed and power. Aside from the motor here are the chief parts you will need: ½-in. grinding and buffing spindle with chuck, which may be obtained from any large hardware store for less than a dollar; ¾-in. pinion for ¼-in. shaft; 1½-in. steel gear with set screw for ½ in. shaft; 9"x9" piece of 14-gauge brass; thrust bearing; 2-in. round brass stock 2½ in. long for spindle bearing; 3 feet of brass strip.

The length of the cut down section of the spindle can be determined by drilling a hole in the center of the gear case. A piece of steel wire inserted through the hole until it touches the surface of the pinion gives the exact distance of pinion from front of gear-case. Drill shaft for set screw accordingly.

Scram's Simple Construction Is Strongest, Lightest and Tightest Known



STEM
5-A
5
4-A
4
3-A
3
2-A
2
1-A
1
TRANSOM
1 3/4" W. OAK
SEE STEM DETAIL
3/4" X 3"
CHINE LINE
2"X6"
1" X 1 1/2"
CUSHION
ENGINE-BED
SEATS AND FLOORING 1/2"
CENTER STRIP 1/2" MAHOG.
7/8" W.OAK
7/8" MAHOG.
L.W.L.
BASE-LINE
STATION 5 LOOKING FWD.
CHINE STRIP 2" X 2" W. OAK
BASE-LINE
STATION 4-A LOOKING FWD.
3/4" X 1 1/8" SPRUCE
L.W.L.
STATION 4 LOOK. FWD.
INST. BOARD 7/8 MAHOG.
STATION 3 LOOKING FWD.
KEEL OF 2"X4" W. OAK
SIDE AND BOTTOM BATTENS 3/8" X 1 1/2"
L.W.L.
TRANSOM FRAMING OF 7/8" W. OAK
TRANSOM LOOK. AFT.
24 1/2"
DECK BEAM CLAMP
STATION 1-A LOOKING AFT.
3/8" MAHOG.
BASE-LINE
MAIN FRAMES OF 7/8" STOCK INTERMEDIATE FRAMES OF 3/4" STOCK, ALL OF 3 3/4" WIDTH
BREAST-HOOK
C.L.
W. OAK REINFORCING
ENGINE STRINGER
CHINE LINE
METAL BRACKETS
METAL ANGLES
HATCH-FRAMING
POSITION OF WATER SCOOP
BOTTOM IS DOUBLE-PLANKED, INSIDE PLANKING DIAGONAL
3/8" X 1 1/2"
OPENING FOR 2" EXHAUST
C.L.
SCALE OF MEASURE IN FT. & INS.

Here is the construction plan of "Scram." Don't ask us to figure the bill of lumber for you; you can easily dope this out from the scantlings and sizes shown above. Topside planking is 3/8" Honduras mahogany, bottom double planked of 3/8" diagonal spruce with 3/8" fore and aft mahogany outside. The fittings for the struts and the casting for the rudder and rudder stock can be furnished by our Experimental Station. The motor plans of conversion will be run next month, complete in all details.

"Scram" in action reveals a brilliant boat with the so-called "level riding" any good design must exhibit, and as well has thundering speed for a craft so tiny. Here she is pushing the forty mark. Sweet running, and smooth, too.

PLANS *for* "SCRAM"

PART II

Here is the second installment of Westy Farmer's most popular boat design. Further notes on her construction, with added plans and photographs, are shown in this month's chapter.

LAST month we took you for a ride in this fiery little, sleek little, inexpensive little thunder boat, and got you started along proper lines in building her. This month we continue but before describing how the frames are got out let's have a word for the men who are here meeting *Scram* for the first time:

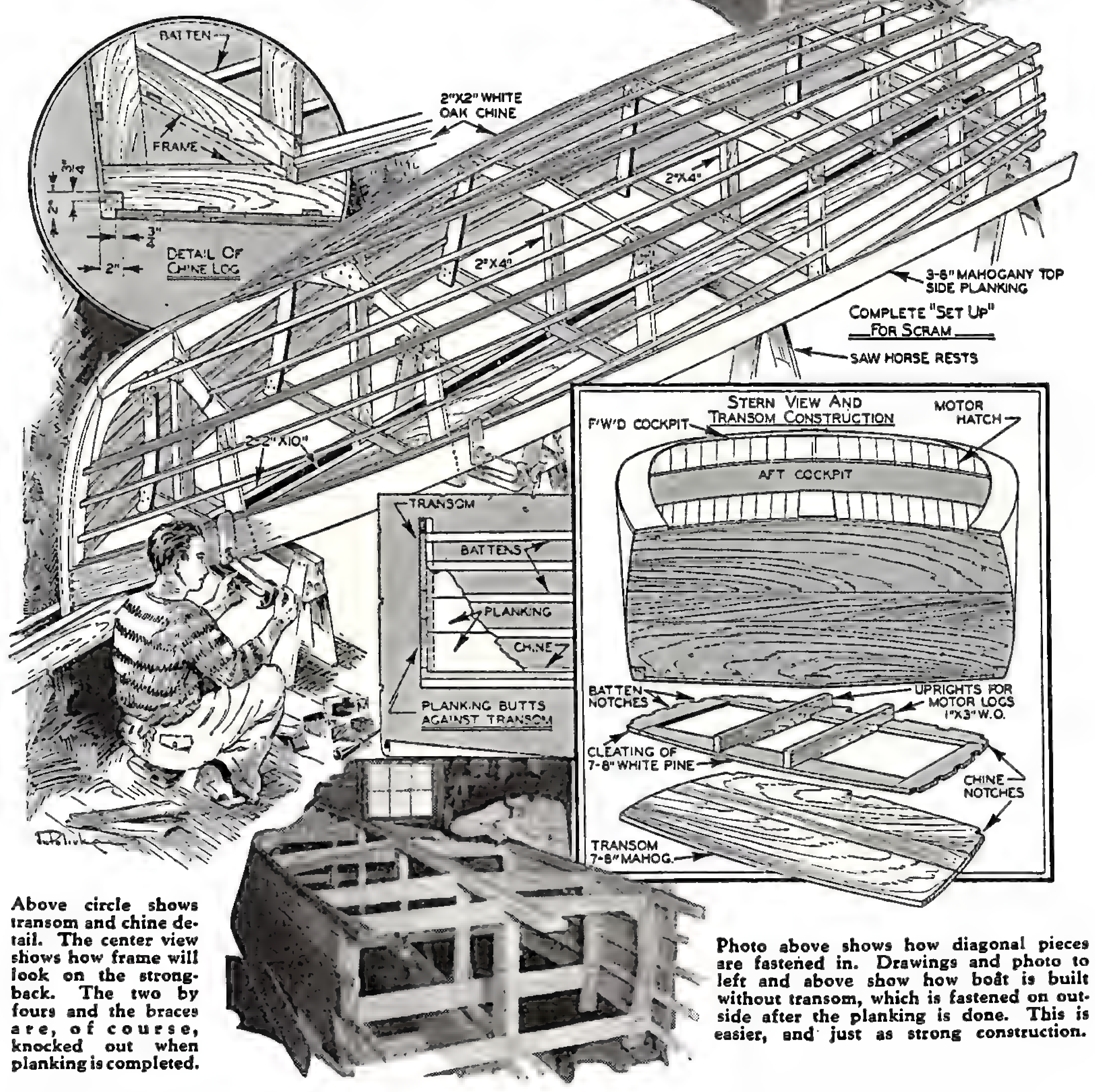
She is 15½ feet long by 5 ft. 2½" beam, by about 15" draft. Powered with a Ford Model A engine (which we'll later show how to convert into a 65 h.p. high duty marine mill) *Scram* is easily capable of leaving all present day two-cockpit runabouts of her size in the lurch when it comes to speed. She banks her turns like an airplane and is a sure cure for all who crave real speed thrills.

Best of all is the matter of the motor. We are working out a list of costs on the matter of finished machined castings and parts needed to take a raw Ford A block assembly, costing $59 new, and turn it into a hot marine engine—not a makeshift, but a real one. You will be pleased to know that the whole engine can be made for about what a good used large model outboard can be bought for.

The Ford motor as it stands can be converted three ways: it can be put in a boat just as it comes from a car, where it'll weigh close to 600 lbs. and take up half the boat, developing 30-38 h.p. You can convert it a second way, using Ford parts and putting on an oil cooler and reverse gear. This is but little better. Then there is the way we have doped it out: deep base, oil cooler, high compression head, cooled manifold, downdraft and reverse gear.

Last issue we ran her lines, outboard profile, pictures of the boat in action, and showed how to lay the lines down. If you have followed us this far you are now ready to rough out the frames.

Showing Complete Frame Details


BATTEN
FRAME
3/4
2
3/4
2"
DETAIL OF CHINE LOG
2"X2" WHITE OAK CHINE
2"X4"
2"X4"
2-2"X10"
3-8" MAHOGANY TOP SIDE PLANKING
COMPLETE "SET UP" FOR SCRAM
SAW HORSE RESTS
TRANSOM
BATTENS
PLANKING
CHINE
PLANKING BUTTS AGAINST TRANSOM
STERN VIEW AND TRANSOM CONSTRUCTION
F'W'D COCKPIT
MOTOR HATCH
AFT COCKPIT
BATTEN NOTCHES
UPRIGHTS FOR MOTOR LOGS 1"X3" W.O.
CLEATING OF 7-8" WHITE PINE
CHINE NOTCHES
TRANSOM 7-8" MAHOG.

Above circle shows transom and chine detail. The center view shows how frame will look on the strongback. The two by fours and the braces are, of course, knocked out when planking is completed.

Photo above shows how diagonal pieces are fastened in. Drawings and photo to left and above show how boat is built without transom, which is fastened on outside after the planking is done. This is easier, and just as strong construction.

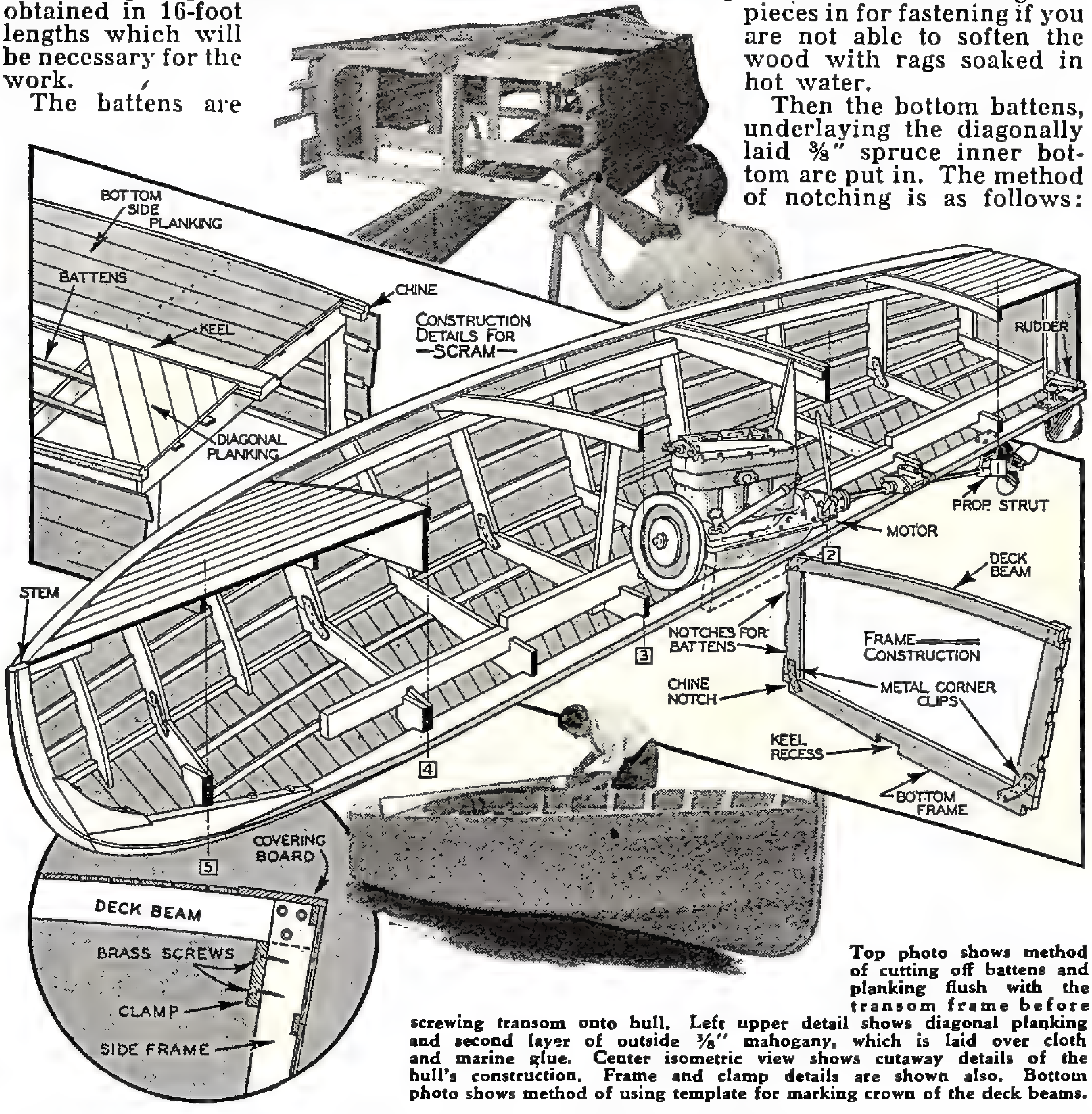
Turn to page 116 to the construction cut shown on that page. You will see that the frames used for making the molds, or for building the boat in other words, are at stations 5, 4, 3, 2 and 1. Now look at this page. Here you will see how the frames have been cross tied at the open part across the top, and how a 2" by 4" of some straight but scrap wood has been mortised so that the frame could be rigidly mounted on it. The 2" by 4" is held in line by two strongback pieces upon which the frame is set up. The frames are properly spaced out on this strongback, and the intermediate frames are placed in the boat after the planking is done. This saves a lot of fairing and fitting which would otherwise go to waste. The number of frames indicated are amply strong for building the boat.

The stem is cut and rabbetted as per the drawing on page 119, which shows how the rabbet is cut and how the clamps join the breasthook. It is easier to make little brass clips for the heels of the frames than to lap the heels of the frames together.

We can furnish you these clips cast in aluminum if you care to write us. The cost is moderate and the labor saved is enormous. Also the resulting job is stronger than as though the heels of the frame at the chine were riddled with screws in the wood that remains after the mortise for the chine piece has been cut.

The transom frame is put up at the same time as the others.

The notches for the battens are done after the frames are up. There are four planks on the topsides, equally spaced in width at the frames. The battens are ⅜" by 1½" white oak. They may be spliced with feather edged splices if the stuff cannot be obtained in 16-foot lengths which will be necessary for the work.


BOTTOM SIDE PLANKING
BATTENS
KEEL
CHINE
CONSTRUCTION DETAILS FOR —SCRAM—
DIAGONAL PLANKING
STEM
RUDDER
PROP STRUT
MOTOR
DECK BEAM
2
NOTCHES FOR BATTENS
3
FRAME CONSTRUCTION
CHINE NOTCH
METAL CORNER CLIPS
KEEL RECESS
4
BOTTOM FRAME
5
COVERING BOARD
DECK BEAM
BRASS SCREWS
CLAMP
SIDE FRAME

Top photo shows method of cutting off battens and planking flush with the transom frame before screwing transom onto hull. Left upper detail shows diagonal planking and second layer of outside ⅜" mahogany, which is laid over cloth and marine glue. Center isometric view shows cutaway details of the hull's construction. Frame and clamp details are shown also. Bottom photo shows method of using template for marking crown of the deck beams.

The battens are let in flush with the edges of the frame, which has, of course, been trimmed off the thickness of the planking as the lines are given to the outside of the planking.

The stock for the frames is ⅞" x 3¾" mahogany on the main frame set ups, and ¾" by 3¾" on the intermediate frames which are put in later.

The battens are feather edged into the stem, and all fastenings are countersunk, being brass screws, No. 7, ¾" long on the battens. Also the same for the clips at the frame heels.

Chine Is Next

The next piece of wood to be put in is the chine. This is a piece of 2" x 2" white oak, or preferably mahogany. Anchored to the transom through the corner edge of the chine piece, liberally countersunk (No. 8, 1½" f.h. brass screw) the piece is successively fastened to the frames as they run forward, and is tapered and cut a bit toward the stem to make bending easier. A rope windlass will bring the pieces in for fastening if you are not able to soften the wood with rags soaked in hot water.

Then the bottom battens, underlaying the diagonally laid ⅜" spruce inner bottom are put in. The method of notching is as follows: Cut one notch in the frame forward. Spring the batten back over the frames, mark the spot it crosses each frame, then saw to the inside of these marks, and cut out the notch with a chisel.

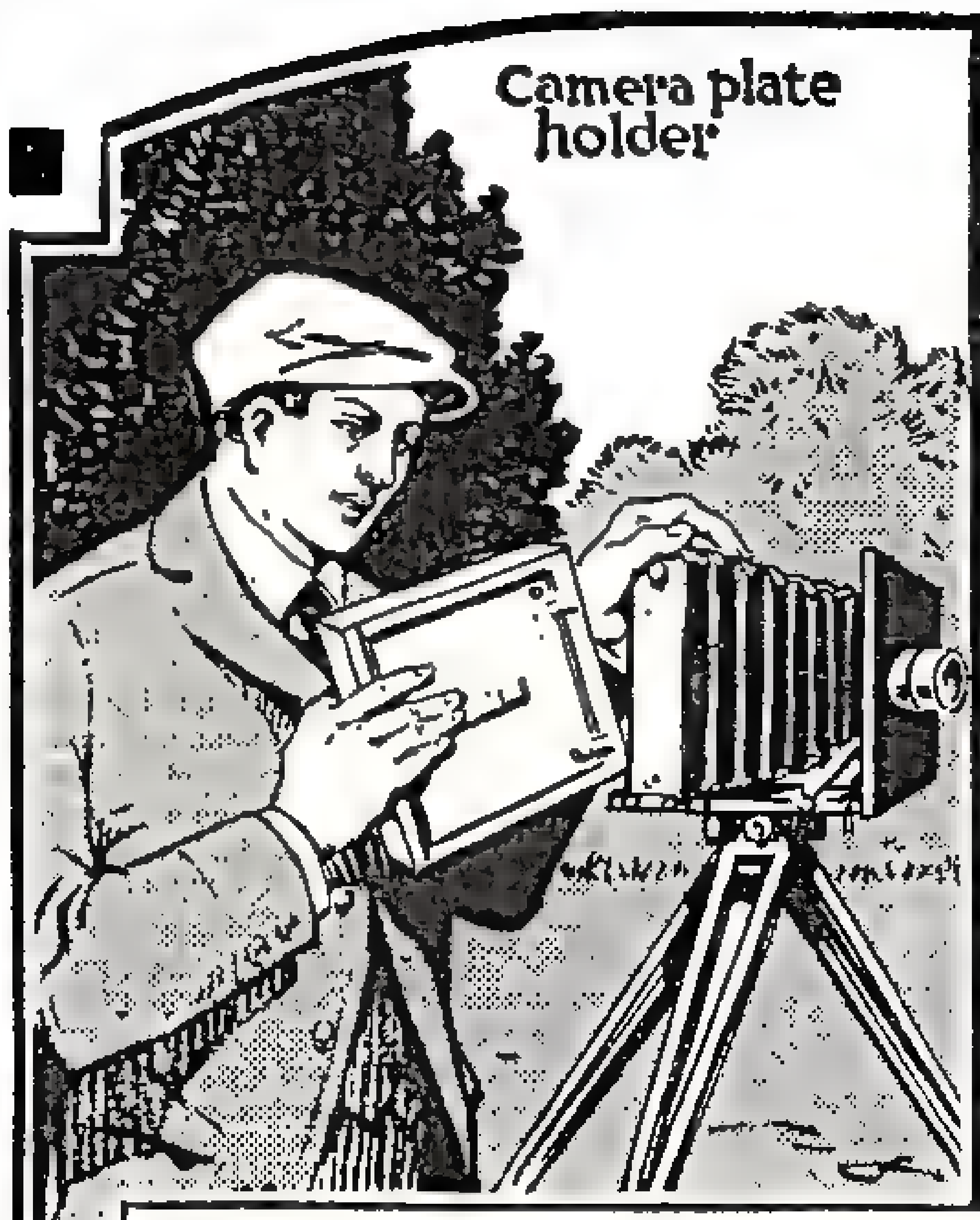
The battens are allowed to run past the transom frame, as the planking, battens and all are trimmed off the last thing prior to putting on the transom itself. Why this is done will be explained later.

Topside Planking Comes First

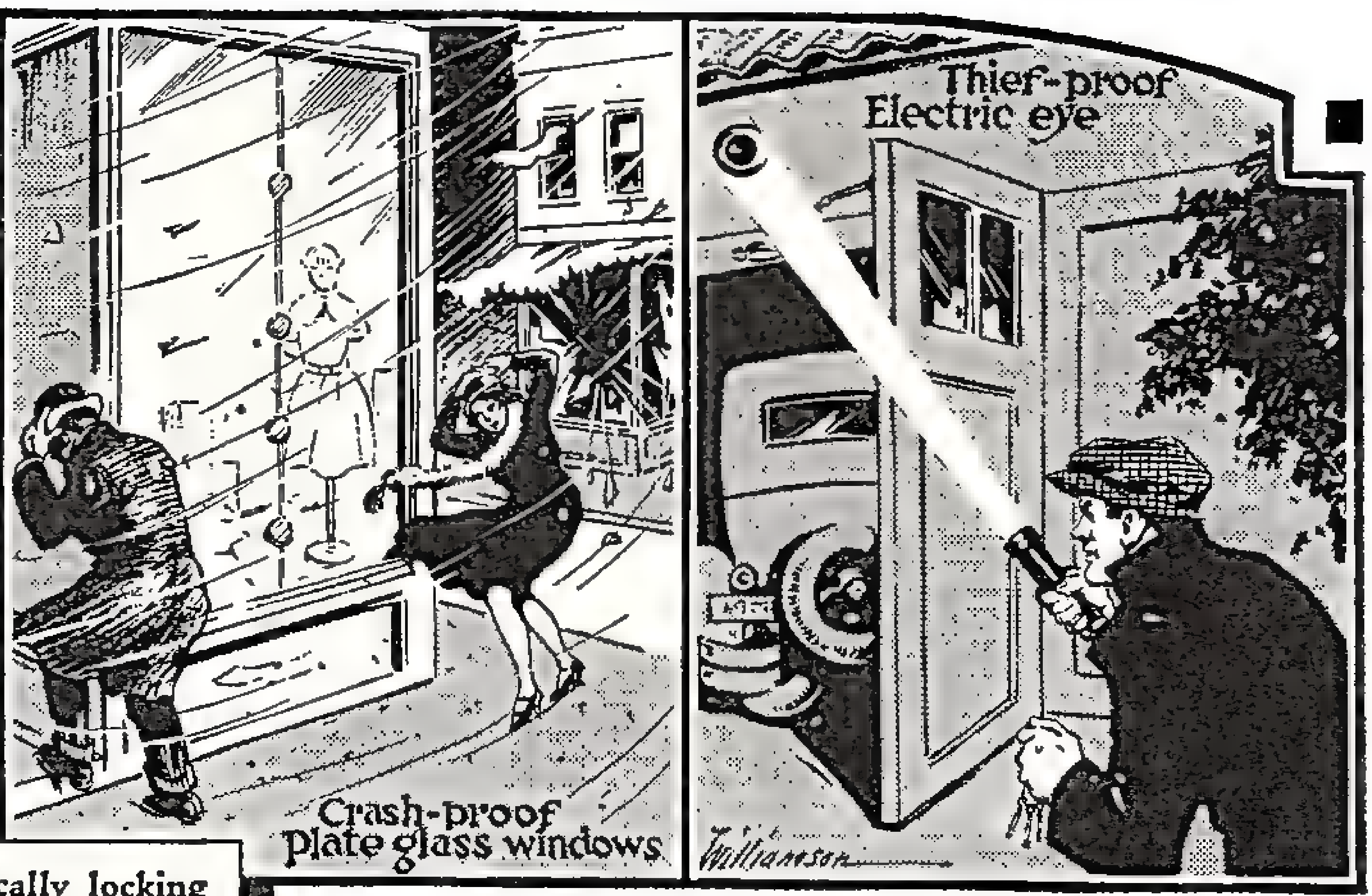
The topside planking comes first. The chine is rabbeted on both the bottom side and the topside, a rabbet, or groove, being cut deep enough to take ¾" planking on

(Continued on page 140)

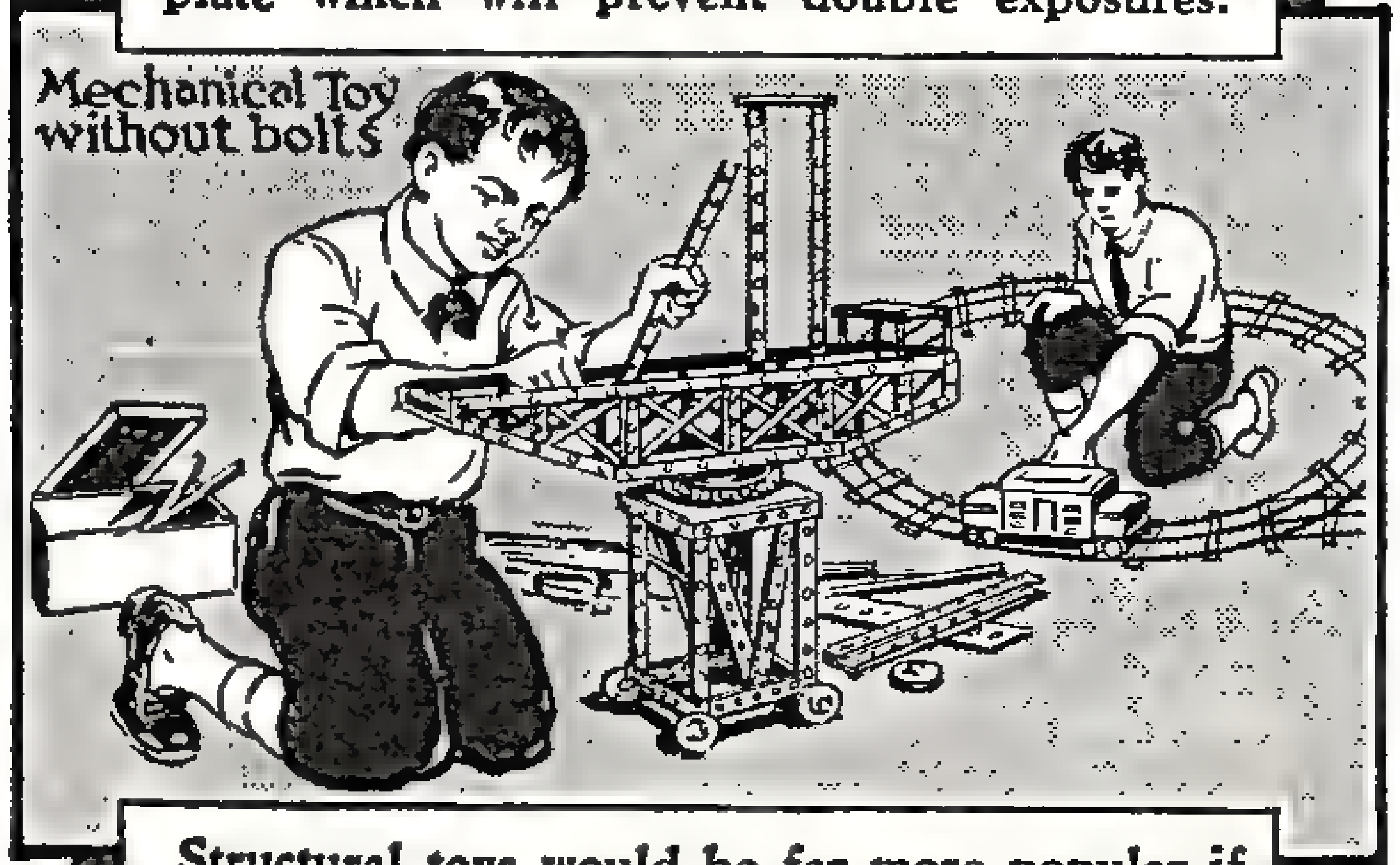
Fortunes Waiting for Inventors



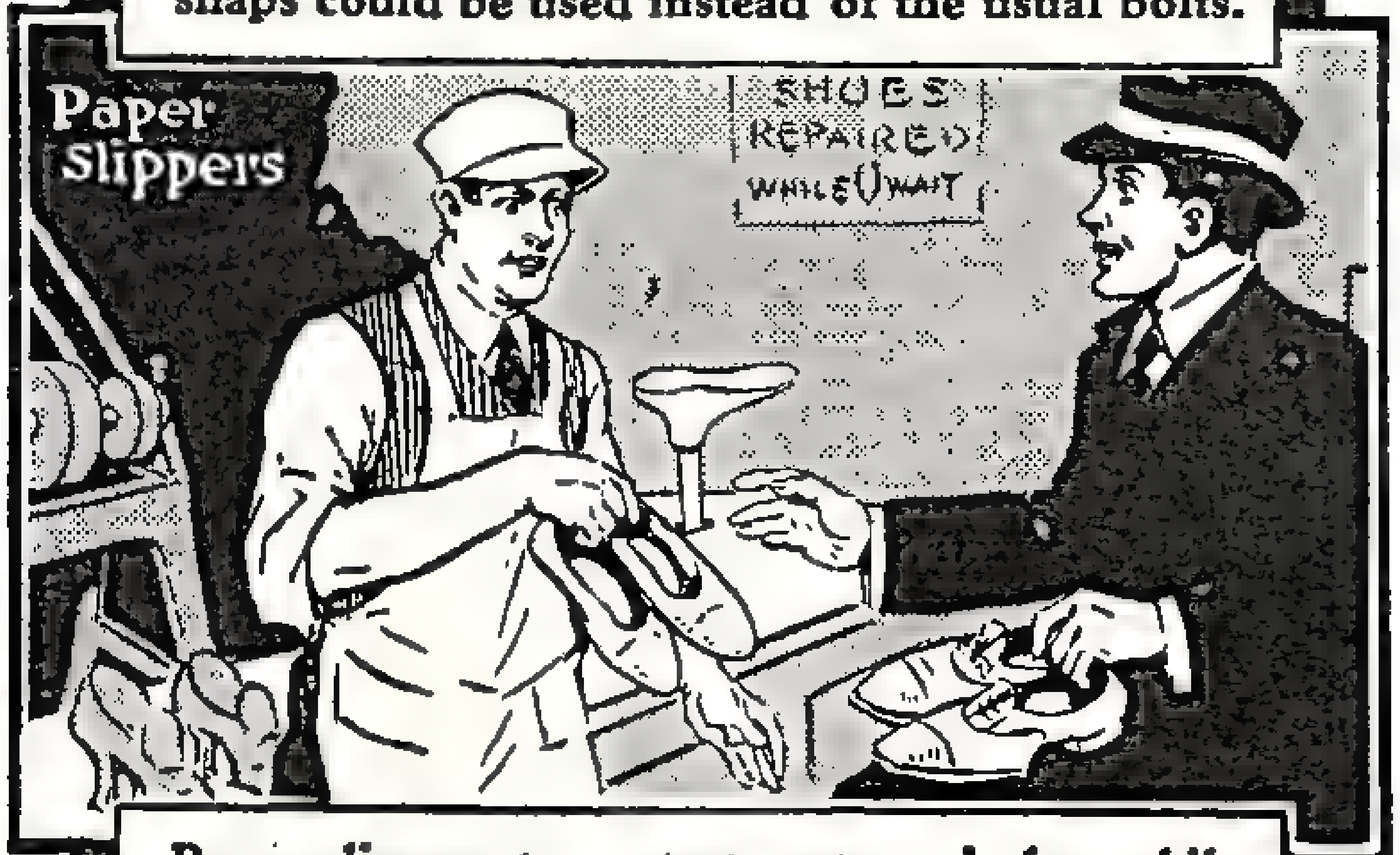
Photographers need an automatically locking plate which will prevent double exposures.



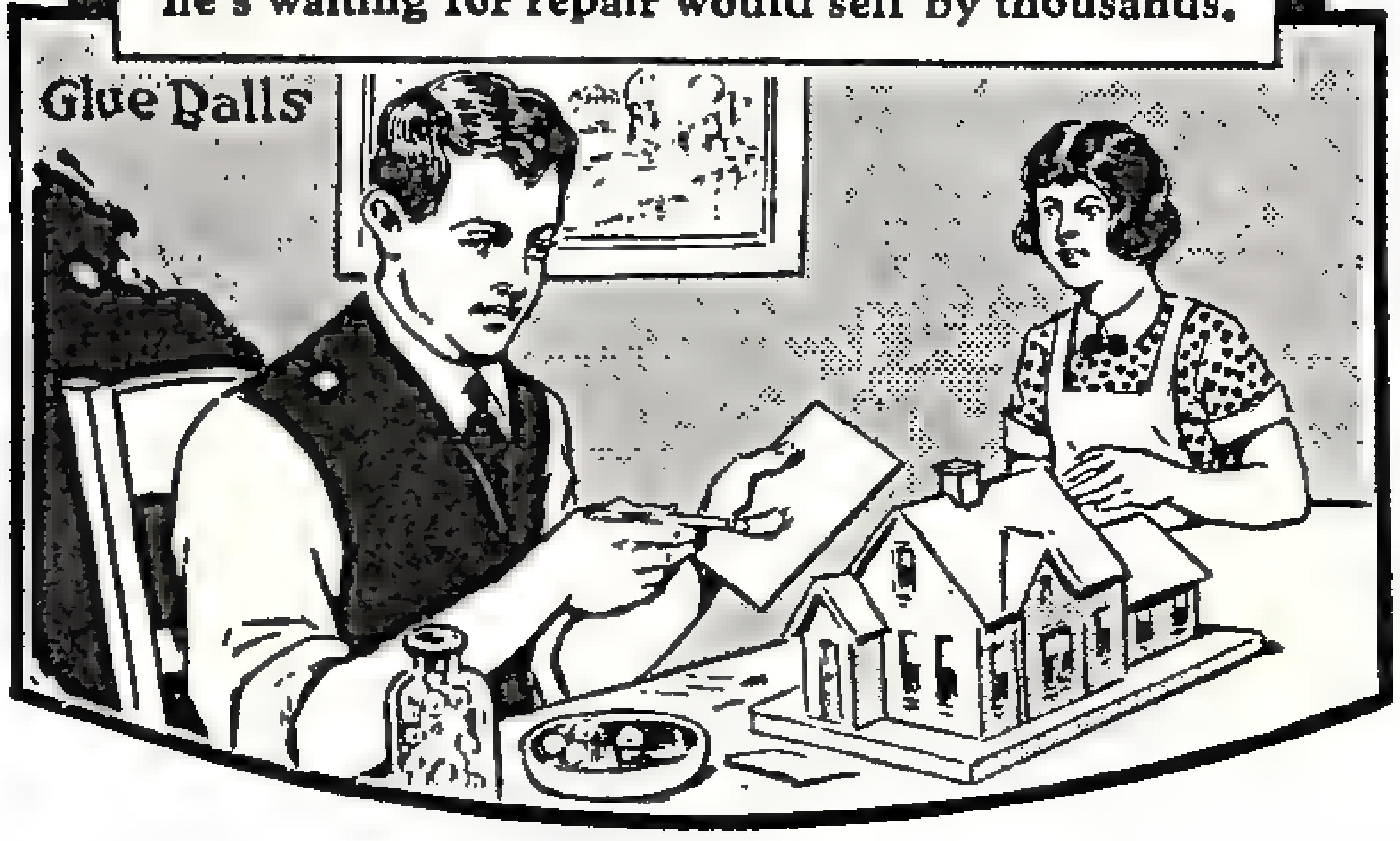
Left—A brace that will hold plate glass windows firm against the onslaughts of hurricane winds is needed to reduce glass insurance. Thief proof electric eye will bring automatic garage doors into vogue and win fortune for inventor.



Structural toys would be far more popular if snaps could be used instead of the usual bolts.


Paper Slippers
SHOES REPAIRED WHILE U WAIT

Paper slippers to protect customer's feet while he's waiting for repair would sell by thousands.



When buying a bottle of glue, you pay more for the bottle than the glue. Costs will be slashed by the invention of a glue that can be sold in ball form in pasteboard boxes.

Editor's note: Mr. Yates, nationally known patent expert who conducts this department, will answer questions of readers desiring advice on how to secure patents, on methods of procedure, or on ideas for inventions, when such requests are accompanied by a stamped, self-addressed envelope. Never send models as they cannot be accepted. Address Mr. Yates care of Modern Mechanix and Inventions, 529 So. 7th St., Minneapolis, Minn.

by RAYMOND F. YATES

Photo-Electric Cells and Garage Door

I confess that this idea calls for an unusually trained inventor. At the present time these cells are being used to automatically open garage doors. This is a great convenience until one also considers the fact that should a prowler light a match in front of the cell while the family is away, the doors will obligingly open, which makes the use of jimmies and pipe cutters unnecessary.

Naturally this sad shortcoming robs this wonderful device of many uses. Why cannot we answer the burglar with a photoelectric relay that will function only when it receives a series of light impulses flashed in a certain code that can be projected upon it? We would have something unbeatable if we had that and electrically controlled garage and other doors would rapidly come into vogue.

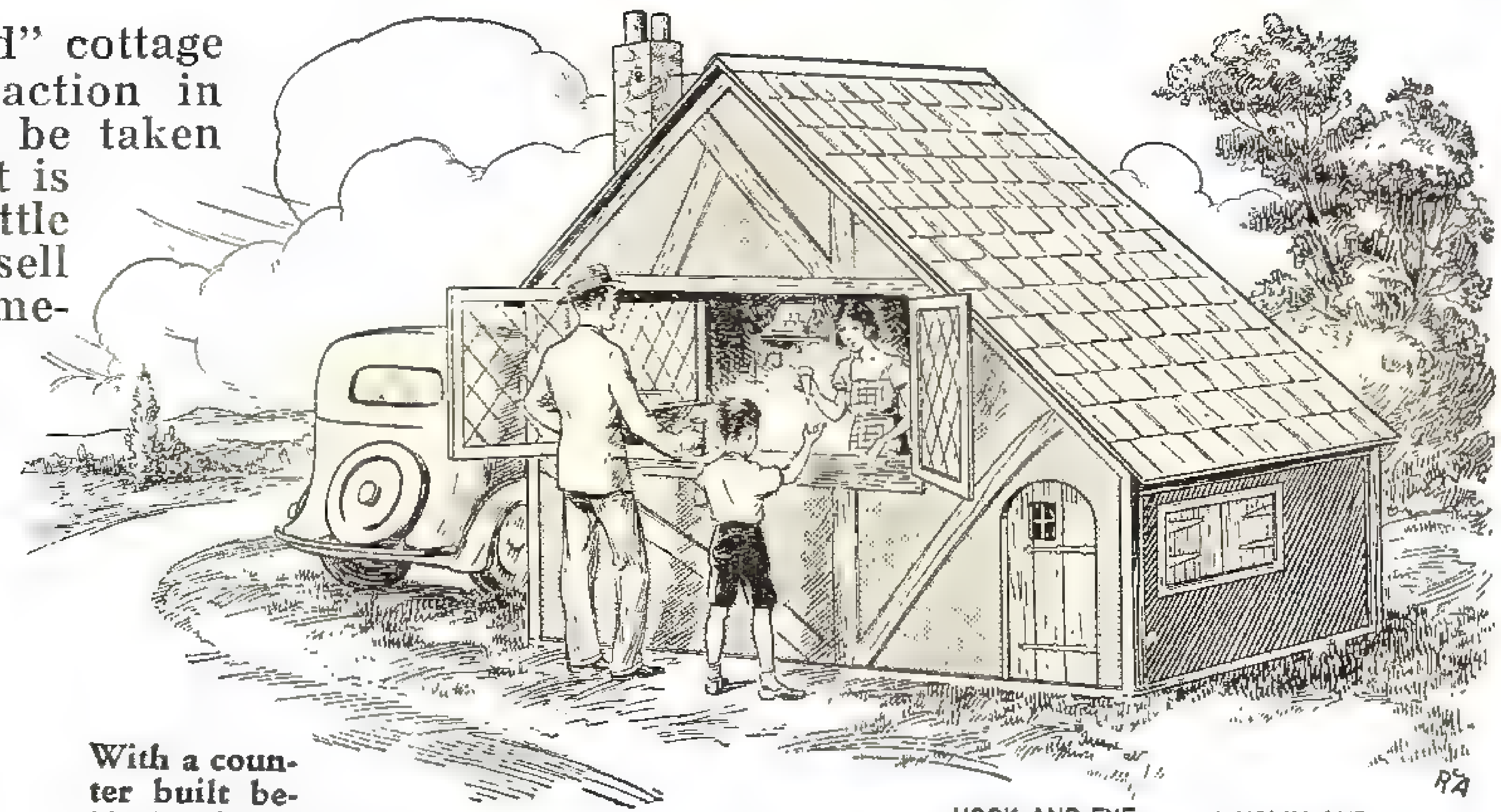
Specifications: Such a device should not add over 100% to the cost of present equipment. This would make the total cost about $250.00.

Exploitation: Should be sold outright to some large electrical manufacturer for $35,000. Inasmuch as Europe is not the mechanized country that the United States is, this invention should be patented only in the United States and Canada.

(Continued on page 144)

Sell Refreshments from Folding Playhouse

THIS little "timbered" cottage has a double attraction in that it not only can be taken apart for moving, but is designed for use as a little shop from which to sell refreshments or home-made novelties.



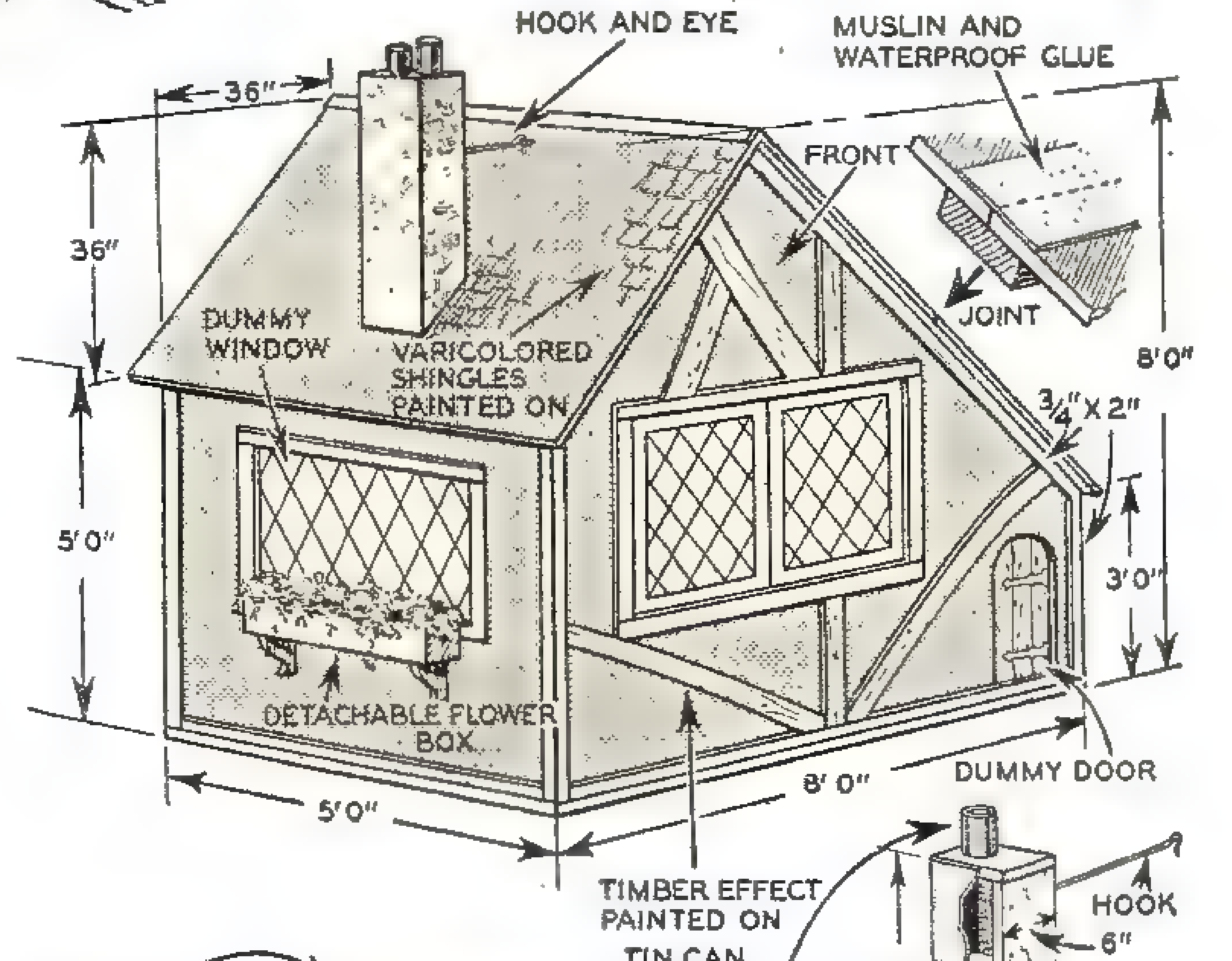
With a counter built behind window sill, the house is attractive refreshment stand.

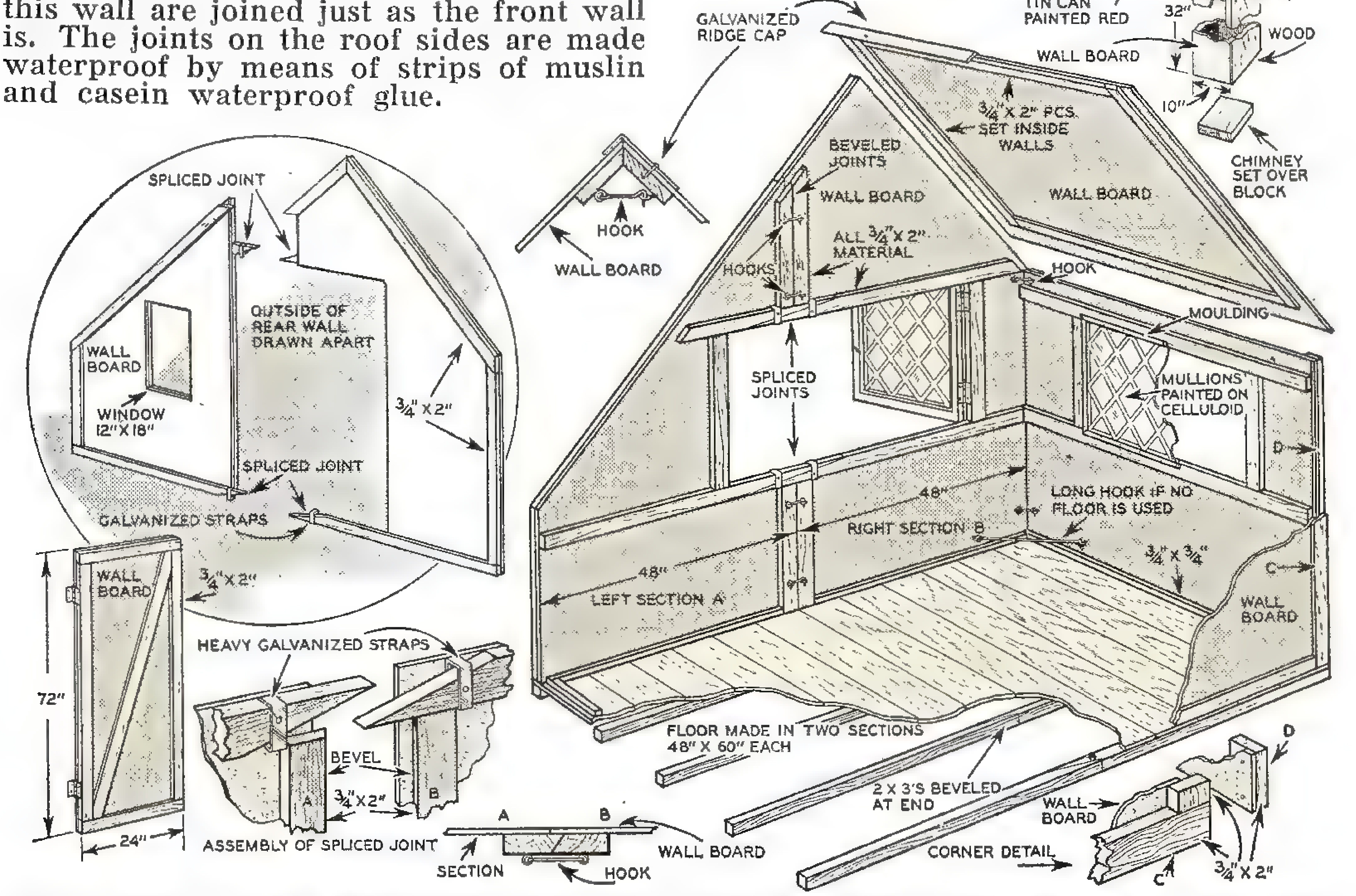
Construction is of wall board or masonite on a light wood framing of ¾"x2" Oregon pine, with flat sections hooked together so they can be knocked down and stored under the house or in the garage.

The general over-all dimensions are given in accompanying drawings. The timbered effect is accomplished simply by painting brown over the white or cream background of the wall-board, and the upright "timber" indicated effectually conceals the joint between the two front sections.

The front wall shown in the drawings is typical construction. Horizontal members of the window frame have spliced joints and the vertical members are beveled. The "glass" is celluloid fastened on the inside with half-round moulding.

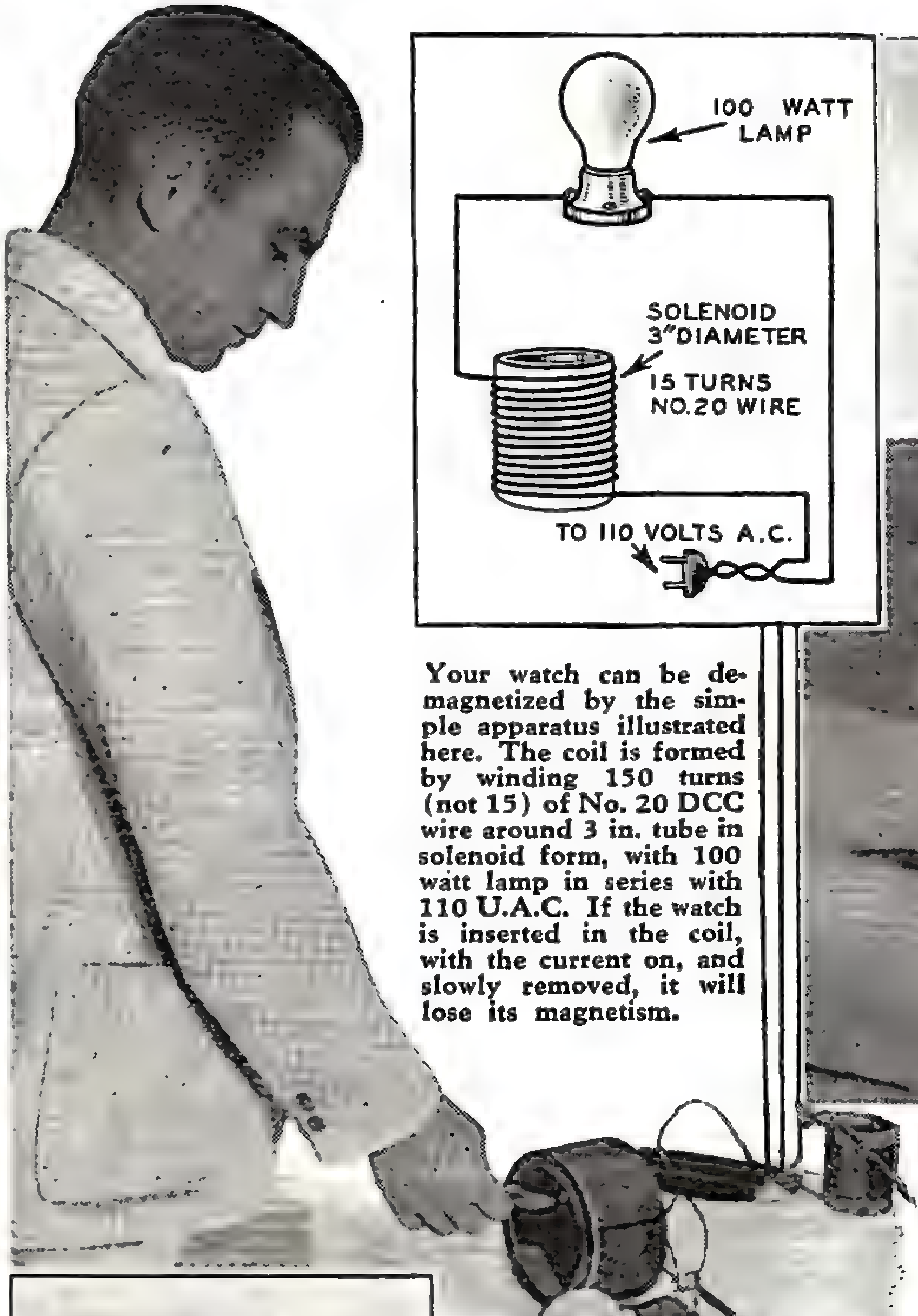
An opening is left in the rear wall for a door 24 in. by 72 in. The two sections of this wall are joined just as the front wall is. The joints on the roof sides are made waterproof by means of strips of muslin and casein waterproof glue.


HOOK AND EYE
MUSLIN AND WATERPROOF GLUE
36"
36"
FRONT
JOINT
8'0"
DUMMY WINDOW
VARICOLORED SHINGLES PAINTED ON
¾"X2"
5'0"
3'0"
DETACHABLE FLOWER BOX
5'0"
8'0"
DUMMY DOOR
TIMBER EFFECT PAINTED ON
TIN CAN PAINTED RED
HOOK
6"

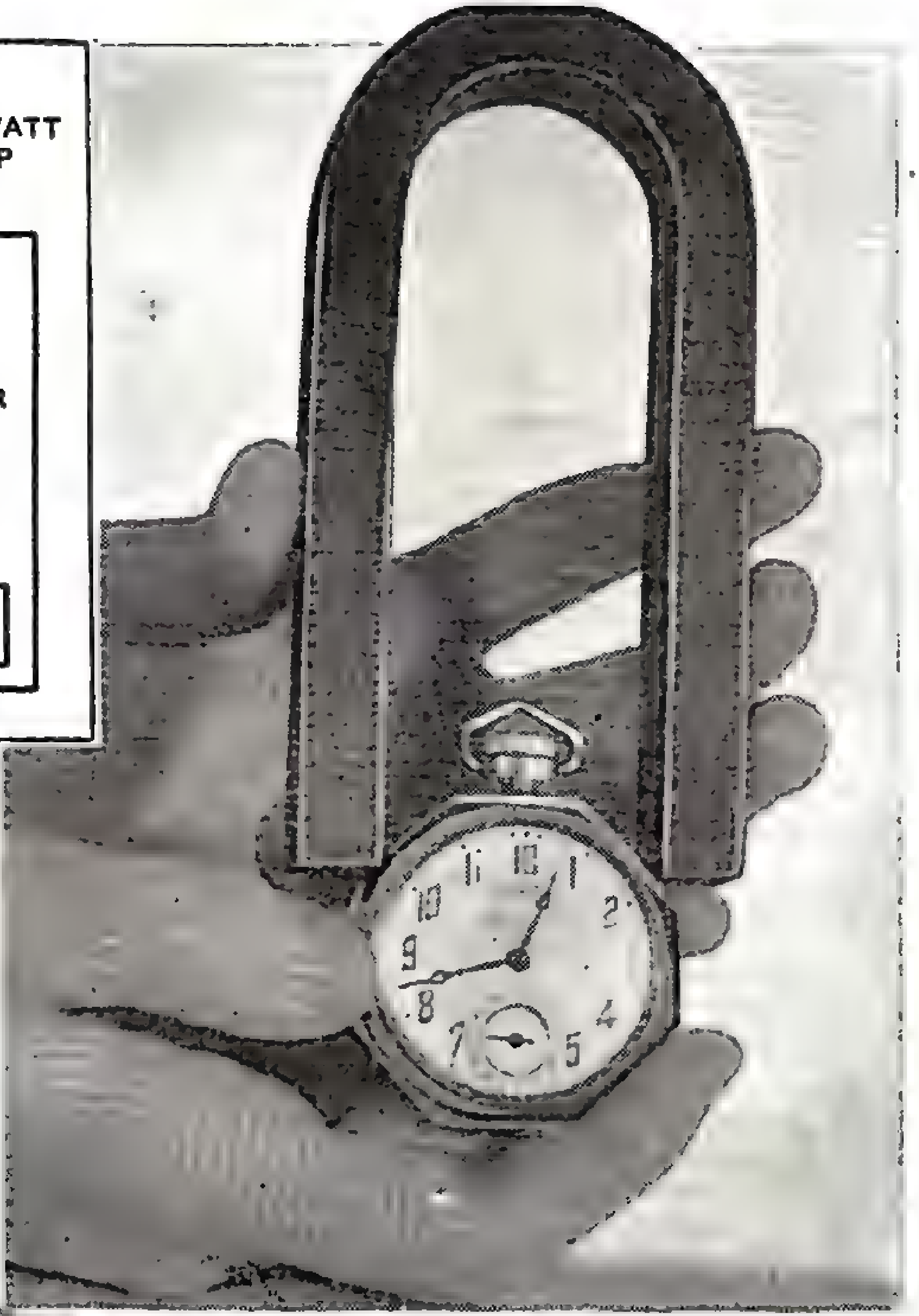

32"
WOOD
WALL BOARD
10"
CHIMNEY SET OVER BLOCK
GALVANIZED RIDGE CAP
¾"X 2" PCS. SET INSIDE WALLS
BEVELED JOINTS
WALL BOARD
WALL BOARD
ALL ¾"X2" MATERIAL
HOOK
WALL BOARD
HOOKS
HOOK
MOULDING
SPLICED JOINTS
MULLIONS PAINTED ON CELLULOID
D
48"
LONG HOOK IF NO FLOOR IS USED
RIGHT SECTION B
48"
¾"X ¾"
LEFT SECTION A
C
WALL BOARD
FLOOR MADE IN TWO SECTIONS 48" X 60" EACH
2 X 3'S BEVELED AT END
D
WALL BOARD
CORNER DETAIL
C
¾"X2"
SPLICED JOINT
OUTSIDE OF REAR WALL DRAWN APART
WALL BOARD
WINDOW 12"X18"
¾"X2"
SPLICED JOINT
GALVANIZED STRAPS
WALL BOARD
¾"X2"
72"
24"
HEAVY GALVANIZED STRAPS
BEVEL
A
¾"X2"
B
ASSEMBLY OF SPLICED JOINT
A
B
SECTION
HOOK
WALL BOARD

Sections of house are spliced and held together with hooks. Parts may thus be disassembled for storage or transportation.

Probing Magnetic Secrets of Your Watch

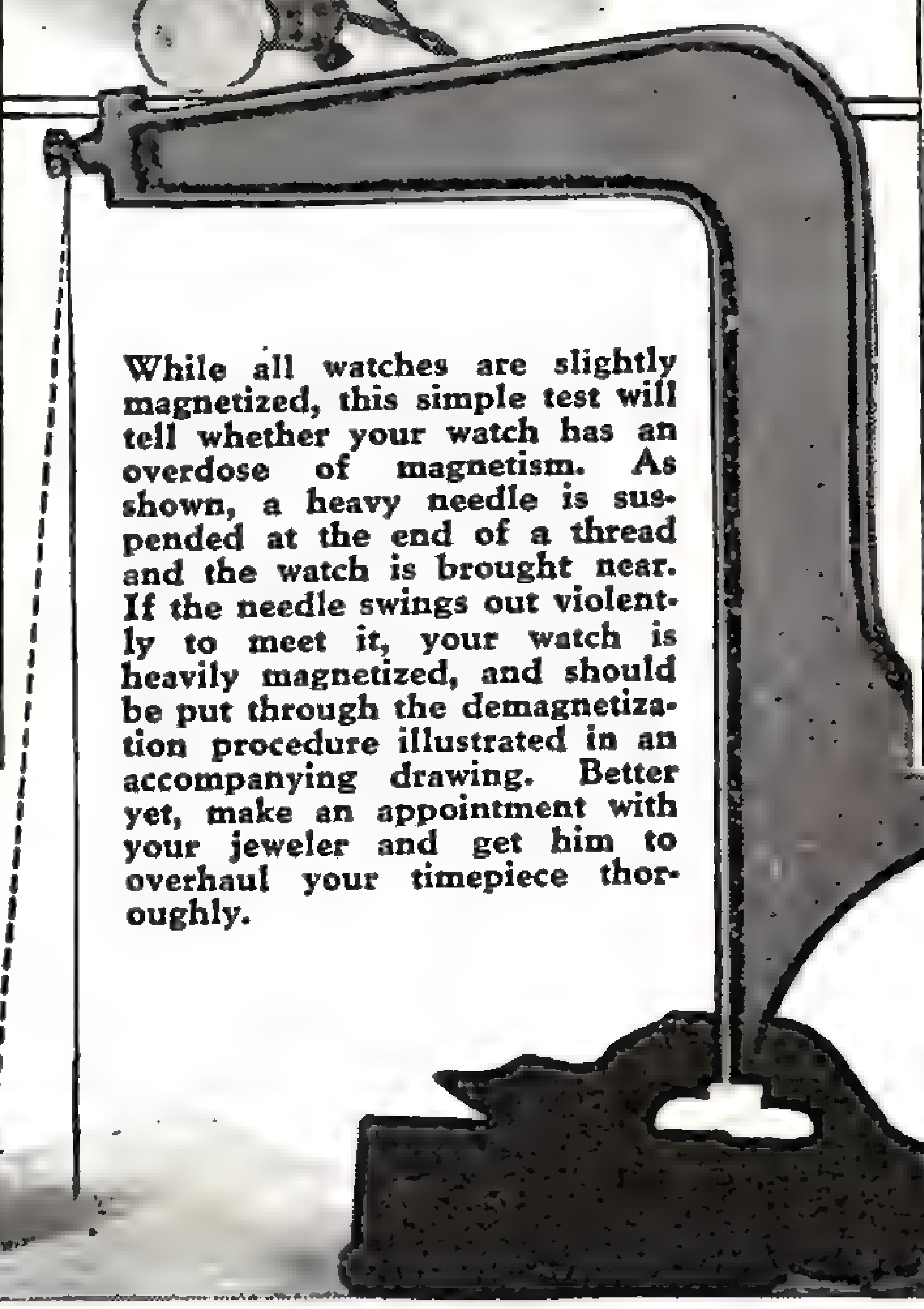


Your watch can be demagnetized by the simple apparatus illustrated here. The coil is formed by winding 150 turns (not 15) of No. 20 DCC wire around 3 in. tube in solenoid form, with 100 watt lamp in series with 110 U.A.C. If the watch is inserted in the coil, with the current on, and slowly removed, it will lose its magnetism.

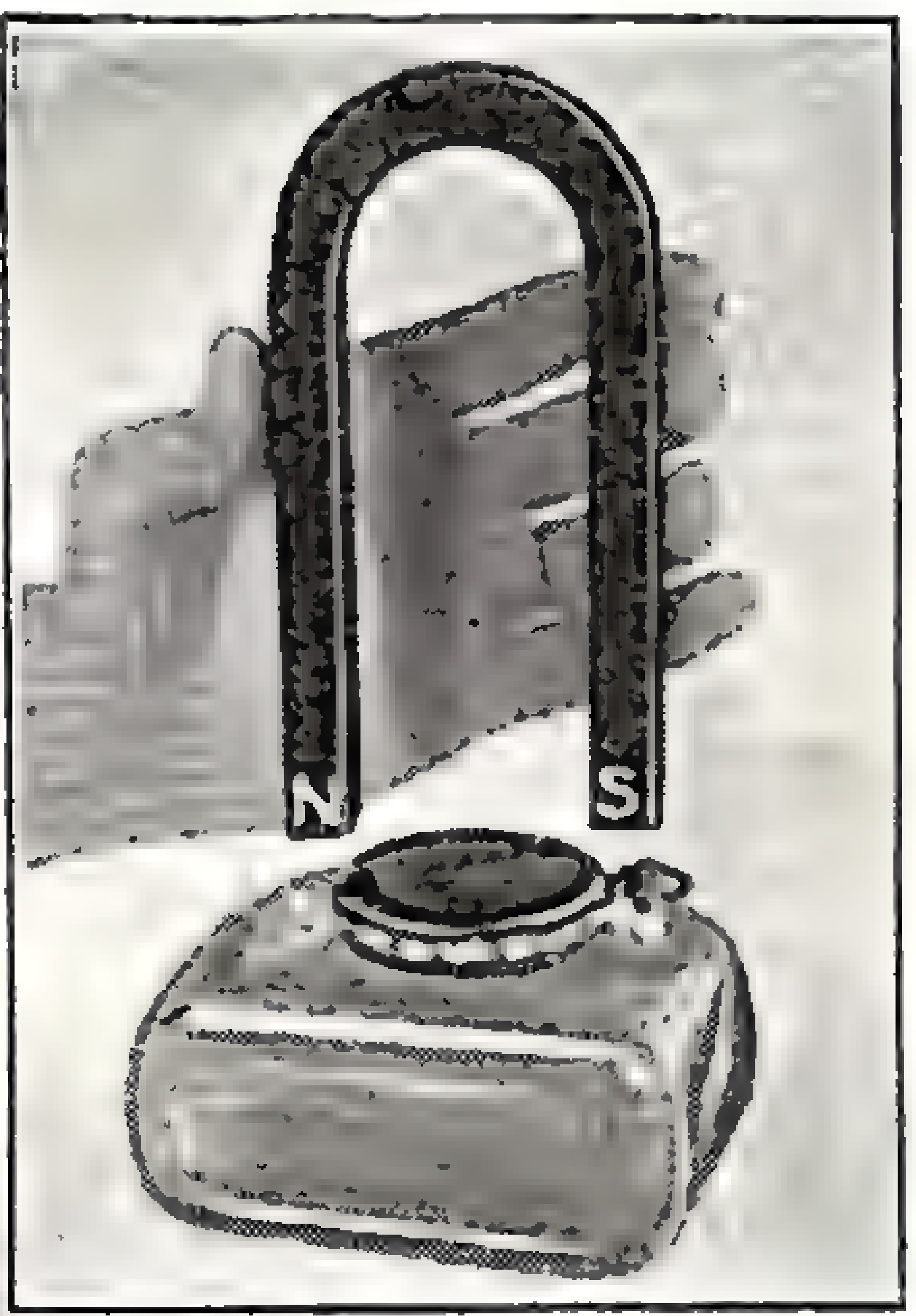


When a magnet is held in this position magnetic lines of force pass through the watch, making it possible to exercise a rough control over the speed of the timepiece and, consequently, of the time it keeps.

When end of magnet is applied to back of watch, the movement is instantly paralyzed. Demagnetization will set it going again, accurately.



While all watches are slightly magnetized, this simple test will tell whether your watch has an overdose of magnetism. As shown, a heavy needle is suspended at the end of a thread and the watch is brought near. If the needle swings out violently to meet it, your watch is heavily magnetized, and should be put through the demagnetization procedure illustrated in an accompanying drawing. Better yet, make an appointment with your jeweler and get him to overhaul your timepiece thoroughly.



How magnetized watches may be tested for polarization. Placed face downward on glass, the timepiece will whirl into position relative to N and S pole of magnet shown here.

SPARKS from the RADIO EDITOR

Edited by L. B. ROBBINS

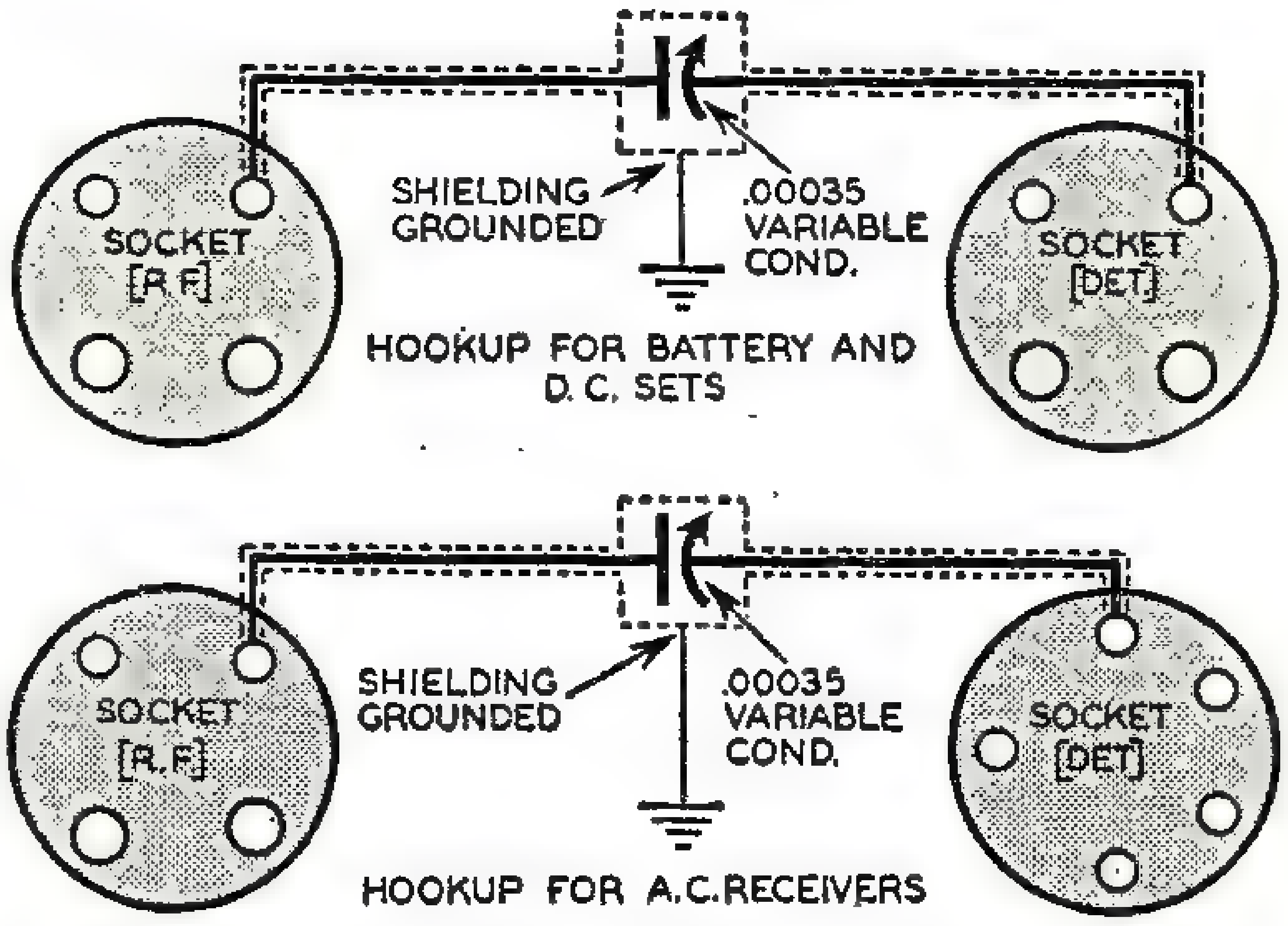
Boosting Volume and Sharpness of T. R. F. Receivers

IN EARLY electric receivers using ganged condensers, chances are that the set does not tune properly all over the band. By employment of this little kink, however, the reception is improved from a mere whisper to enough volume to fill the room.

A variable condenser, which may be taken from an old broadcast receiver, and two lengths of shielded lead in wire will do the job. It's a good idea to mount and shield the condenser.

Connect the device in the circuit as illustrated at right. In operation, the condenser is opened and a station is tuned in in the usual manner. Then start tuning the condenser until a maximum volume of undistorted music is received.

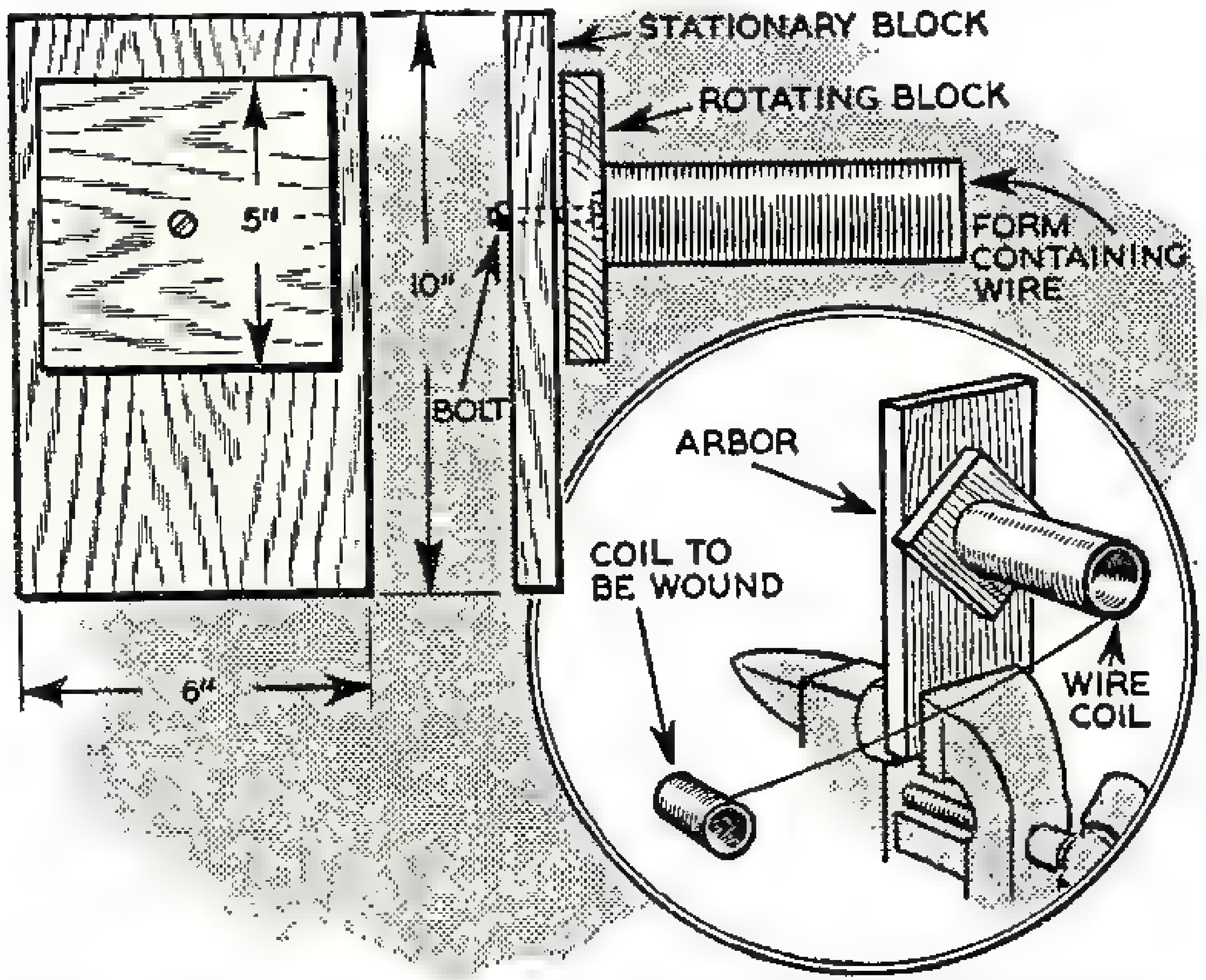
Once the music becomes distorted while turning the regeneration dial, it is time to retard the dial several points. Otherwise an ear-splitting howl may result. If your set uses all five-prong R. F.'s connect both wires to prong shown for A.C. detector. The last R. F. tube can be distinguished easily since it is the tube next to the detector in the direction of the antenna and ground terminals.


SOCKET [R F]
SHIELDING GROUNDED
.00035 VARIABLE COND.
SOCKET [DET]
HOOKUP FOR BATTERY AND D. C. SETS
SOCKET [R.F]
SHIELDING GROUNDED
.00035 VARIABLE COND.
SOCKET [DET]
HOOKUP FOR A.C.RECEIVERS

For increased sharpness and volume, hook the condenser in circuit as shown, shielding the wire to the prongs.

When you've got the set working right, you'll be amazed at the new volume and sharpness of your set.

Arbor for Unreeling Fine Wire

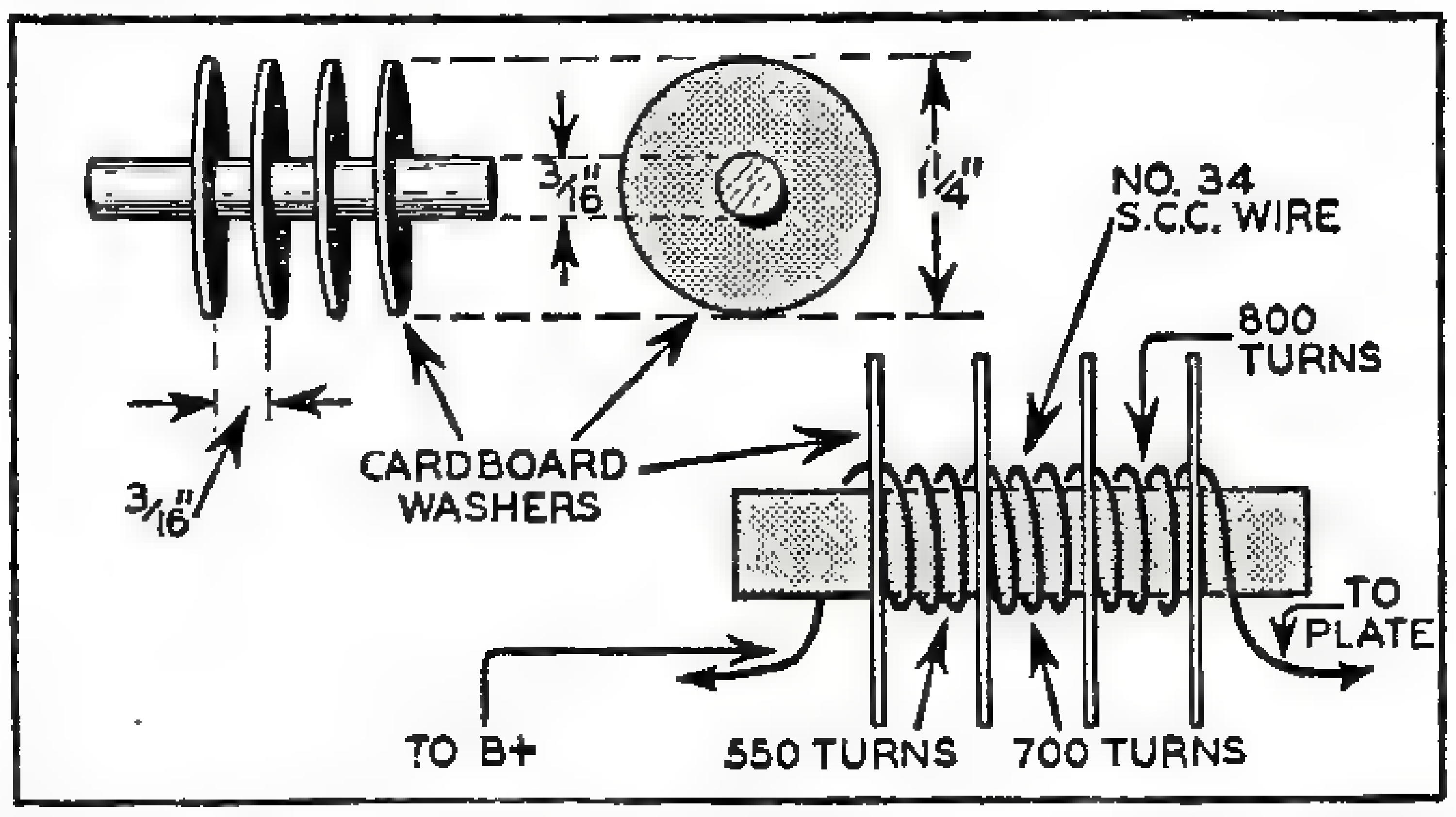

STATIONARY BLOCK
ROTATING BLOCK
5"
10"
FORM CONTAINING WIRE
BOLT
6"
ARBOR
COIL TO BE WOUND
WIRE COIL

Wire spool is affixed to the rotating block, which permits the wire to unroll without strain, eliminating breakage.

IDEAL for winding coils with wire of No. 36 or smaller is this little arbor, which may be constructed from the dimensions given above. Fasten the wire spool to the center of the small board, as near its center as possible. The form to be wound is held in the hands and walked back a few feet, then wound up towards the arbor. For more wire, the worker walks slowly back until enough is unwound and the procedure repeated until the form is fully wound. The arbor winds easily with very little strain on the fine wire and no breakage.

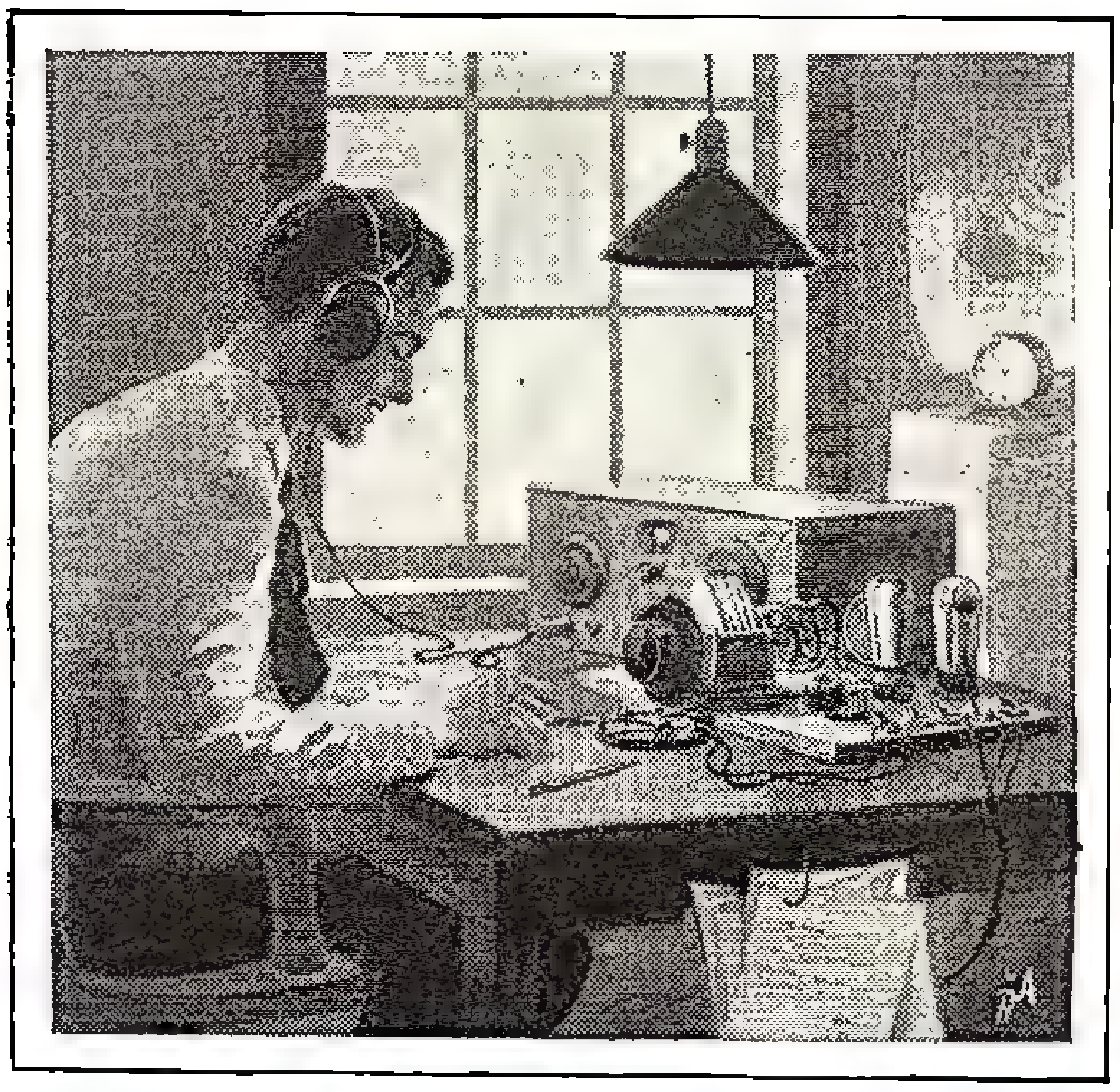
Making 85 Millihenry Choke Coil

WHEN a broadcast receiver hook-up calls for an R. F. choke it usually means one of about 85 millihenries. Here's how they may be built. First get a small wooden film spool and strip off the metal ends. Now cut out four washers of stiff cardboard or fiber board and glue them on the spool as illustrated in the drawing below. Next scramble wind 500 turns of No. 34 SCC wire in the first section, 700 in the second, and 800 in the third. When completed fasten the ends of the windings and cover the turns with Duco cement. Of course, all three sections are one continuous piece of wire. Connect the coil in the circuit as illustrated in the drawing.


3/16"
1 1/4"
NO. 34 S.C.C. WIRE
800 TURNS
3/16"
CARDBOARD WASHERS
TO PLATE
TO B+
550 TURNS
700 TURNS

Three sections of No. 34 SCC wire are scramble wound between the cardboard washers and inserted in plate circuit.

Talk with Entire Continent on



Amateur radio station with 20 meter transmitter in operation.

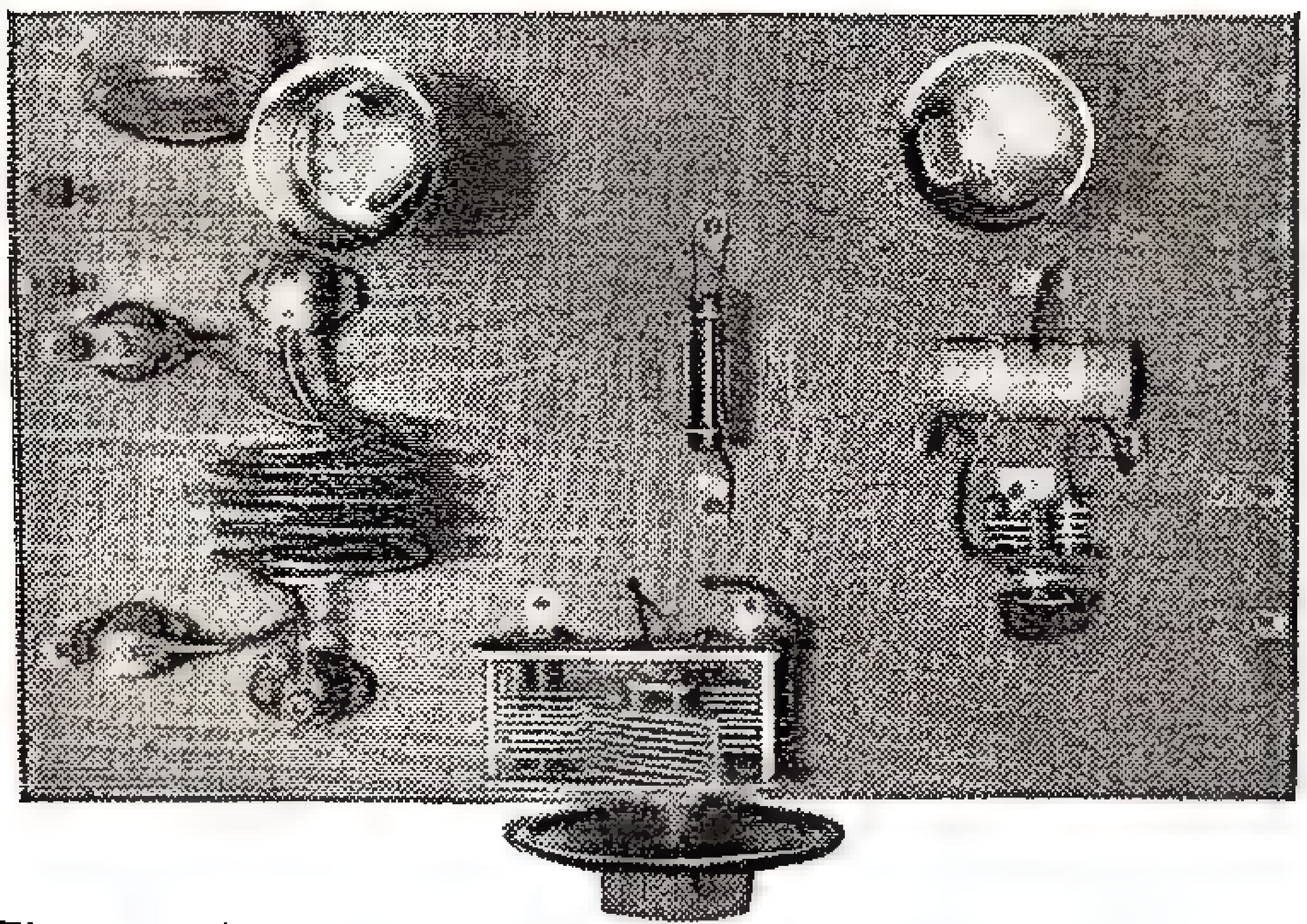


Fig. 1. Top view shows layout of parts on board.

Signals from this little transmitter, which can be built for about $5, will put you in communication with all amateurs within 2000 miles. Get on the air with it and make radio friends all over the continent.

THE little transmitter shown in the accompanying photographs and sketches has been designed for the amateur who wants to operate on the 20 meter band exclusively. The new power tubes called pentodes are used as the oscillators, a pair of them being used in a push-pull circuit.

This transmitter is for code work only. Due to the push-pull circuit and its inherent stability, using a good DC power supply, with the circuit properly tuned, the note will have nearly crystal characteristics and your reports should be consistently "Xtal, pure DC".

A pair of 247s using 500 volts will give an output of between 12 and 15 watts. Two 233 tubes at 180 volts will show considerably better than 6 watts.

The transmitter as shown, exclusive of tubes and power supply, can be built by the careful buyer for less than five dollars. Using 247s over a month's use, the set gave excellent results, and consistently contacted amateurs between 800 and 2000 miles.

Note the neat appearance. All wiring is done beneath the baseboard as seen in Fig. 4, leaving just the dominant parts above deck. This base was a single board smoothed down and cut 15 inches long by 10 inches wide.

The parts were arranged exactly as shown in Figs. 1 and 2. About 4 inches from

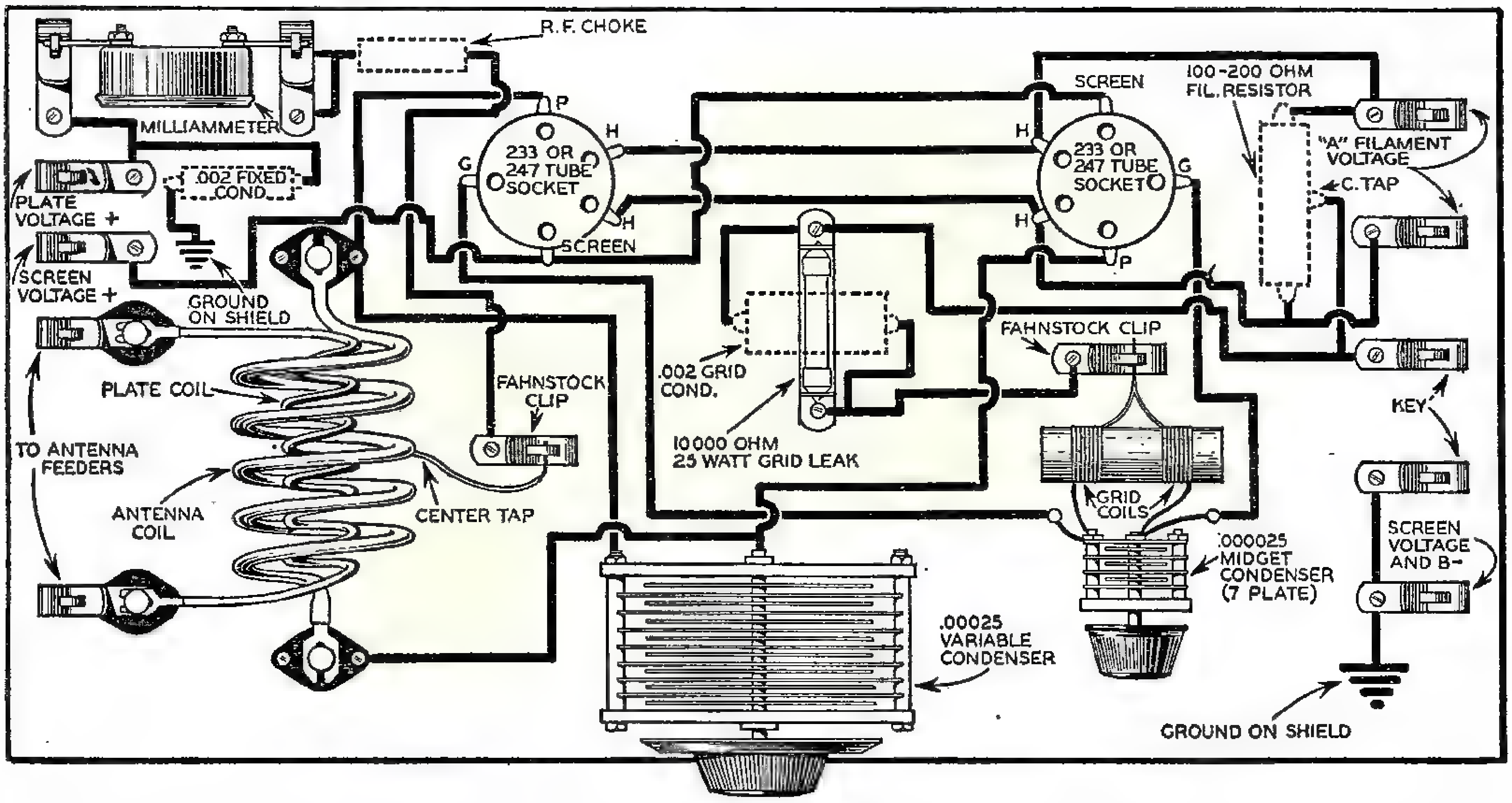

R.F. CHOKE
MILLIAMMETER
.002 FIXED COND.
PLATE VOLTAGE +
SCREEN VOLTAGE +
GROUND ON SHIELD
P
H
G
233 OR 247 TUBE SOCKET
H
SCREEN
PLATE COIL
TO ANTENNA FEEDERS
ANTENNA COIL
CENTER TAP
FAHNSTOCK CLIP
.002 GRID COND.
10000 OHM 25 WATT GRID LEAK
SCREEN
100-200 OHM FIL. RESISTOR
H
233 OR 247 TUBE SOCKET
G
H
P
"A" FILAMENT VOLTAGE
C. TAP
FAHNSTOCK CLIP
KEY
GRID COILS
.000025 MIDGET CONDENSER (7 PLATE)
.00025 VARIABLE CONDENSER
SCREEN VOLTAGE AND B−
GROUND ON SHIELD

Fig. 2. When secured to baseboard, all parts are hooked up according to this diagram. Fahnestock clips for external connections are disposed along sides and rear. Parts shown in dotted lines are mounted under baseboard, where all wiring is run.

this 20 METER Transmitter

HOW TO BECOME A RADIO AMATEUR
Want to get on the air and talk to the whole world with your key? How to build and operate your own short wave station, how to master the code, and how to procure your radio amateur's license—everything you'll need to know is told in the booklet "How to Become a Radio Amateur" available for 25 cents at Modern Mechanix and Inventions, 529 So. 7th St., Minneapolis, Minn.

each end and 2 inches from the rear edge place a socket as shown. Use 5 prong sockets for the filament type tubes such as the 247 or the 233. For pentodes indirectly heated (having a cathode) use 6 prong sockets. Face the two heater prongs of each socket towards each other.

Use an 0 to 200 milliammeter. To the back terminals fasten two stiff wire legs bending their ends at right angles to fit in the clips on the base provided for them. You can thus take the meter out quickly if necessary. Provide a small jumper wire with clip to shunt the meter out when keying.

The grid coil consists of a piece of wooden window shade roller 2½ inches long. Using No. 30 DCC wire, put on two separate windings of 8 turns each, as illustrated. Space the windings about 1 inch. Fasten the winding ends under the heads of pins cut off and driven into the wood. Connect the two inside turns together to form the center tap. The .000025 midget tuning condenser, of course, is mounted in front of the coil in a vertical position.

When the coil is finished flood the windings with waterproof cement so the turns will retain their position. Otherwise any

(Continued on page 136)

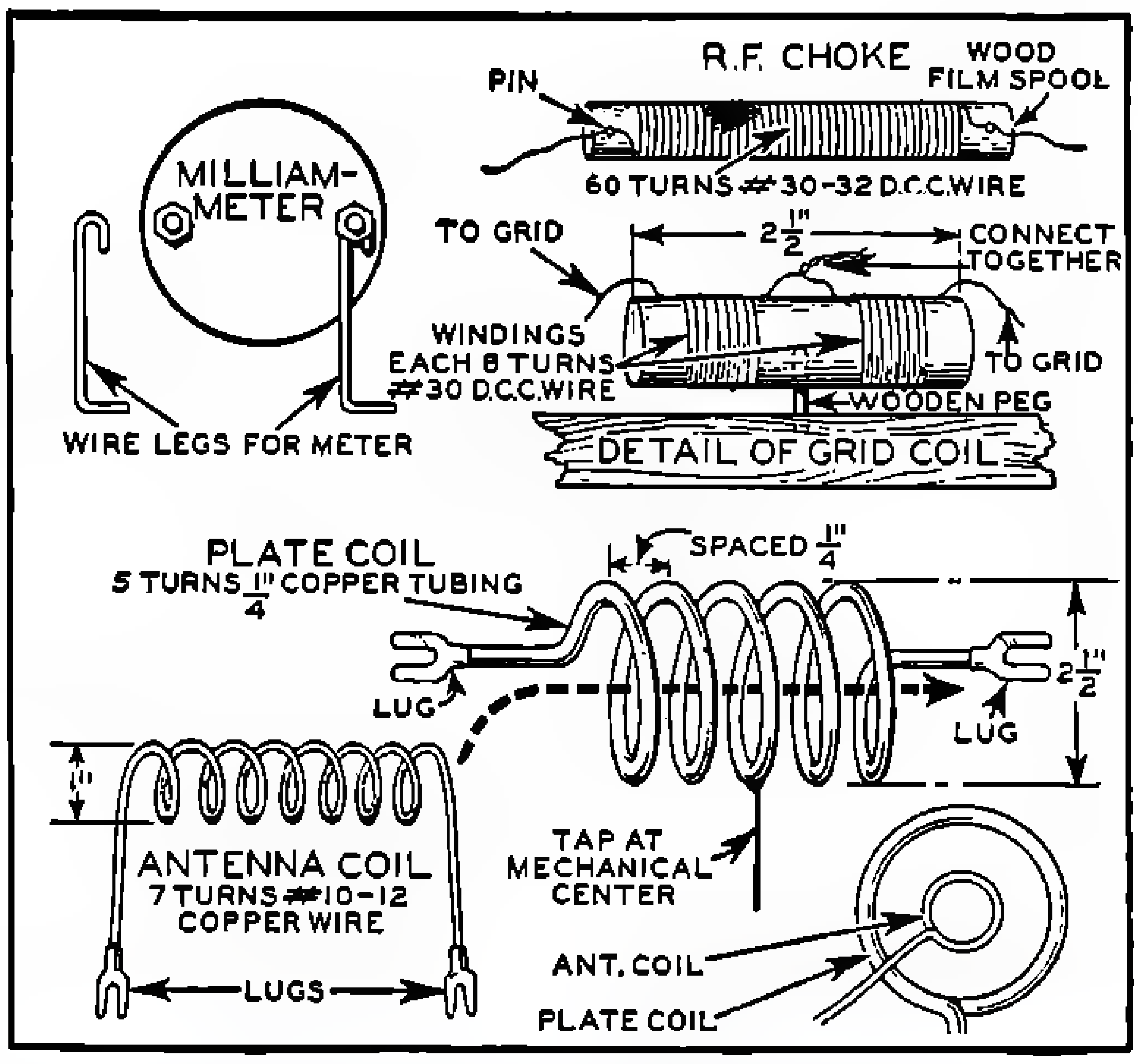
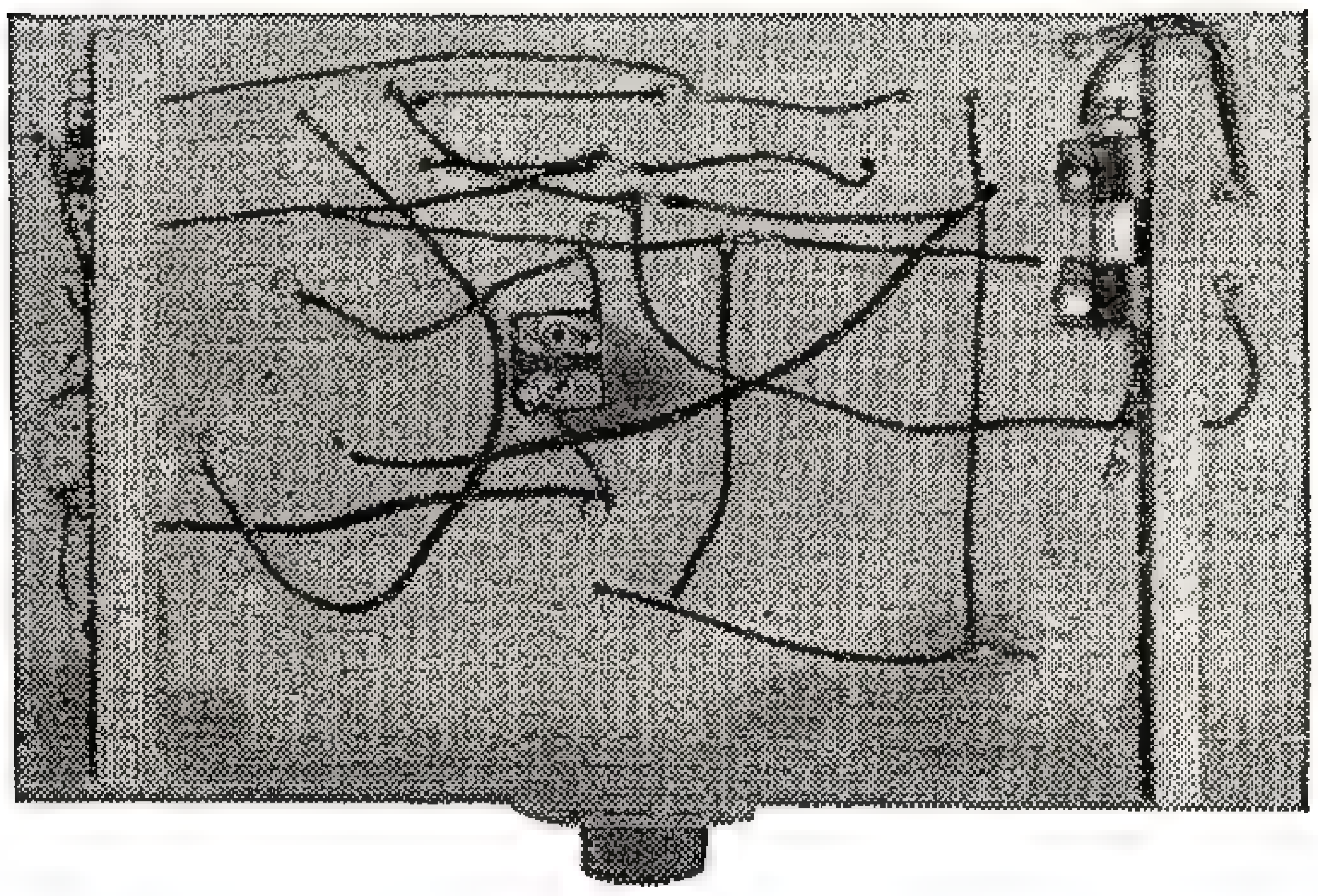

R.F. CHOKE
WOOD FILM SPOOL
PIN
60 TURNS #30-32 D.C.C.WIRE
MILLIAM-METER
TO GRID
$2\frac{1}{2}$"
CONNECT TOGETHER
WINDINGS EACH 8 TURNS #30 D.C.C.WIRE
TO GRID
WOODEN PEG
WIRE LEGS FOR METER
DETAIL OF GRID COIL
PLATE COIL
5 TURNS $\frac{1}{4}$" COPPER TUBING
SPACED $\frac{1}{4}$"
LUG
$2\frac{1}{2}$"
LUG
1"
ANTENNA COIL
7 TURNS #10-12 COPPER WIRE
TAP AT MECHANICAL CENTER
ANT. COIL
LUGS
PLATE COIL

Fig. 3. Milliammeter is supported on wire legs. Below, how plate and antenna coils are wound and fitted together.



Underside view shows how wiring is done. Note cleats which hold board up from table, allowing space for wires.

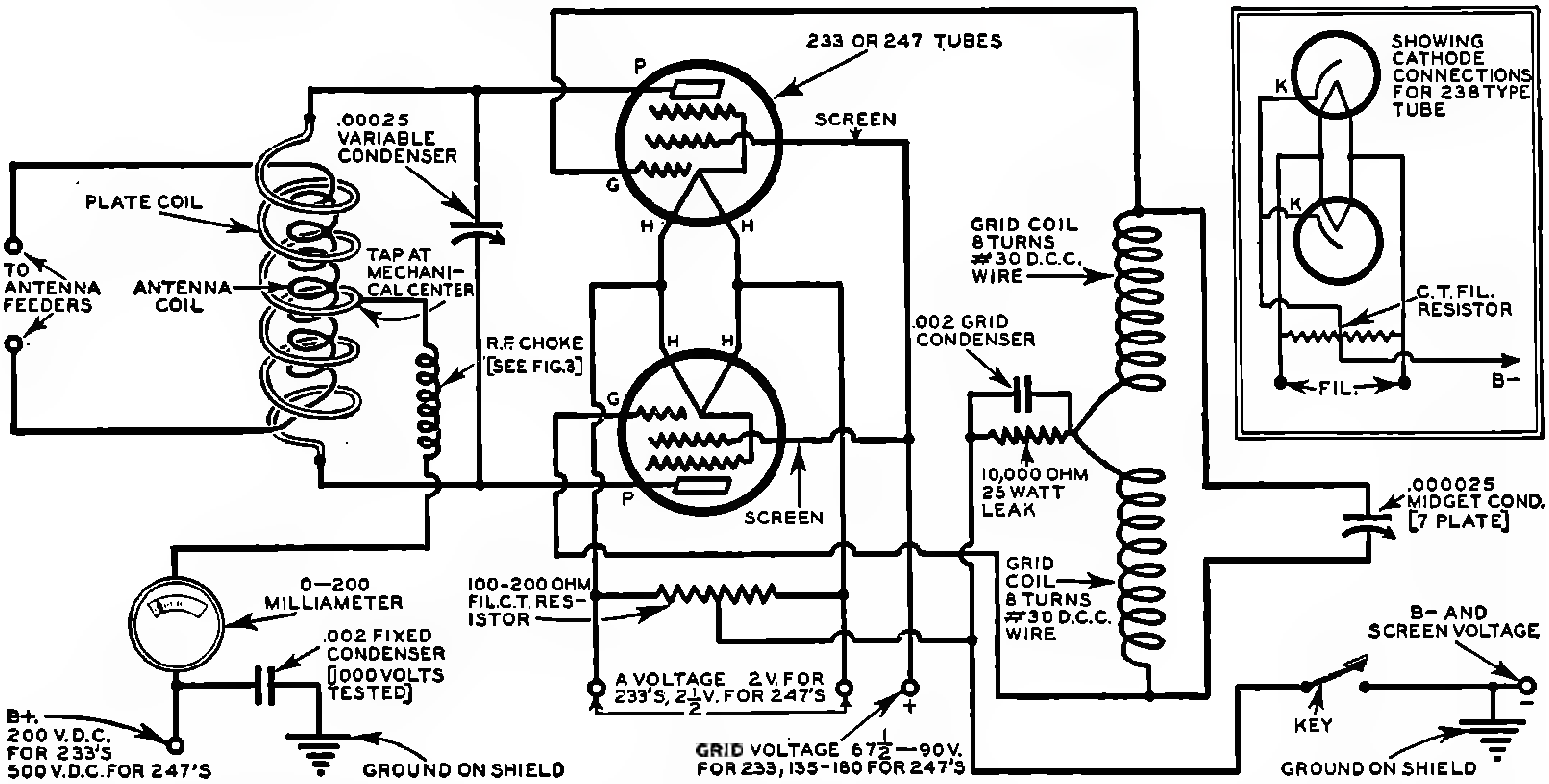
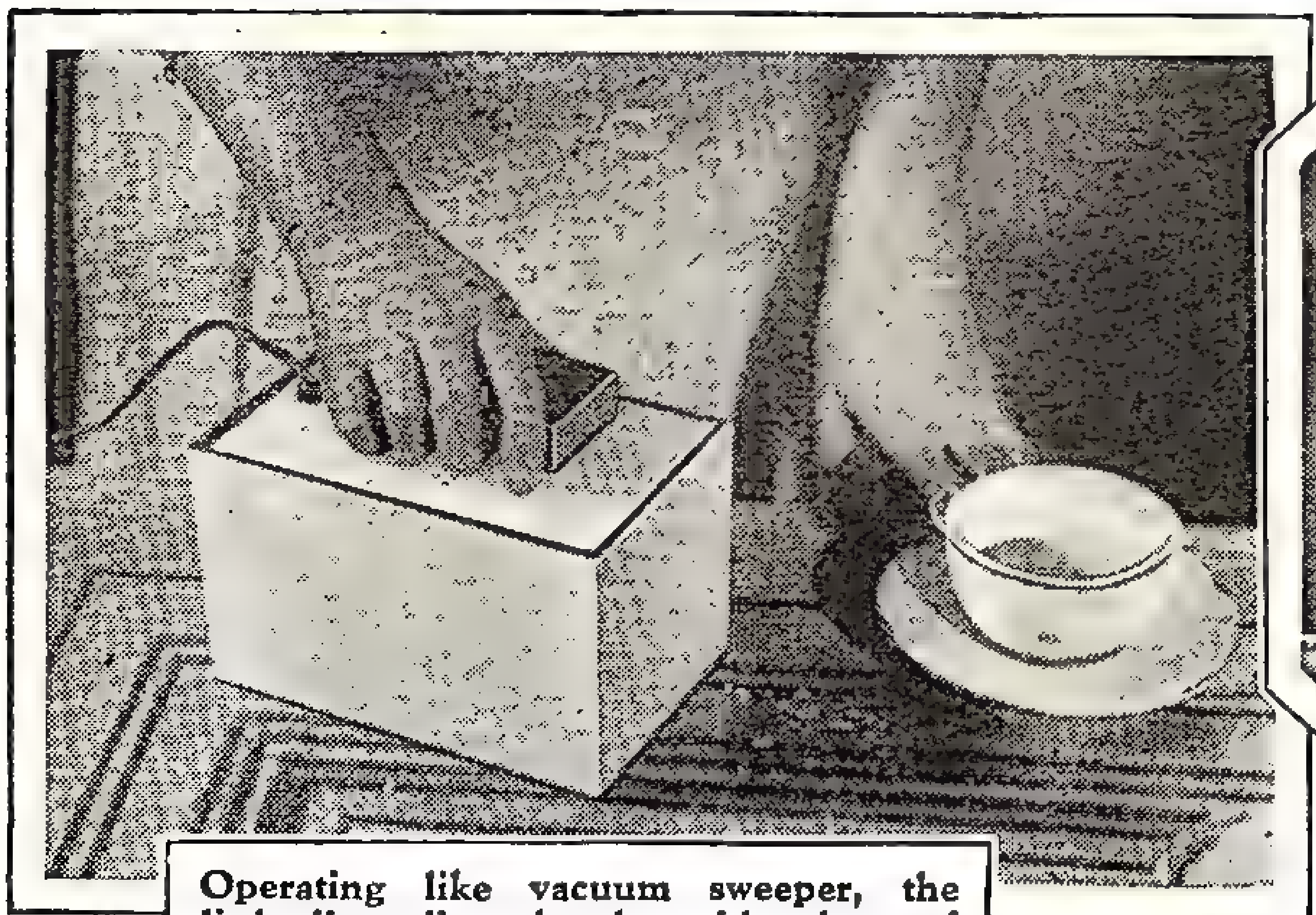
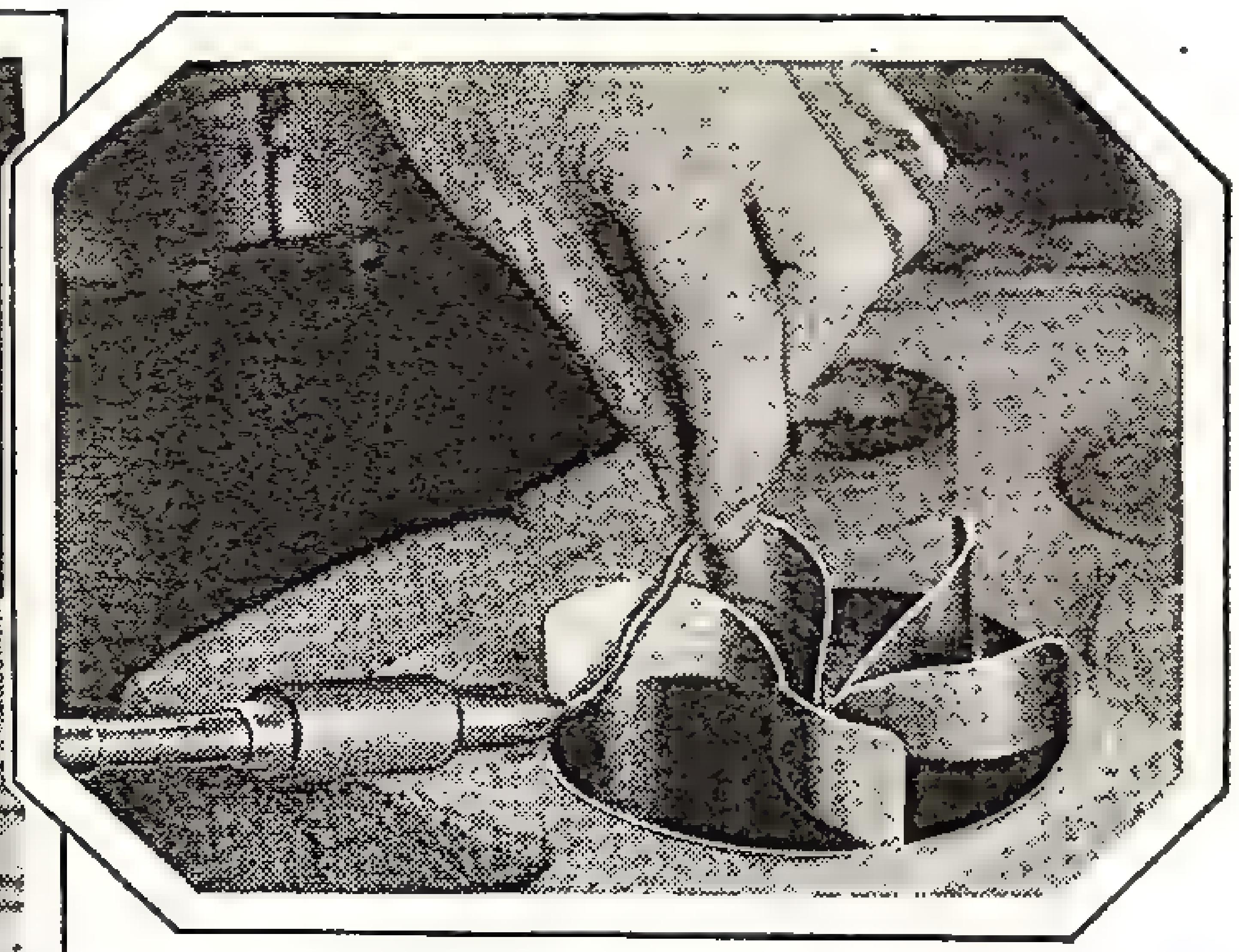

233 OR 247 TUBES
P
G
H
H
SCREEN
.00025 VARIABLE CONDENSER
PLATE COIL
TO ANTENNA FEEDERS
ANTENNA COIL
TAP AT MECHANICAL CENTER
R.F. CHOKE [SEE FIG.3]
H
H
G
P
SCREEN
GRID COIL 8 TURNS #30 D.C.C. WIRE
.002 GRID CONDENSER
10,000 OHM 25 WATT LEAK
GRID COIL 8 TURNS #30 D.C.C. WIRE
SHOWING CATHODE CONNECTIONS FOR 238 TYPE TUBE
K
K
C.T. FIL. RESISTOR
FIL.
B−
.000025 MIDGET COND. [7 PLATE]
0—200 MILLIAMETER
.002 FIXED CONDENSER [1000 VOLTS TESTED]
B+. 200 V.D.C. FOR 233'S 500 V.D.C. FOR 247'S
GROUND ON SHIELD
100-200 OHM FIL.C.T. RESISTOR
A VOLTAGE 2 V. FOR 233'S, $2\frac{1}{2}$ V. FOR 247'S
+
GRID VOLTAGE $67\frac{1}{2}$—90 V. FOR 233, 135-180 FOR 247'S
B− AND SCREEN VOLTAGE
−
KEY
GROUND ON SHIELD

Fig. 5. Follow this diagram also when wiring up with layout scheme in Fig. 2. Lead marked to ground on shield at left may be taken directly to B minus lead, which takes both plate and screen voltage minus. Screen terminal is marked K on tubes.

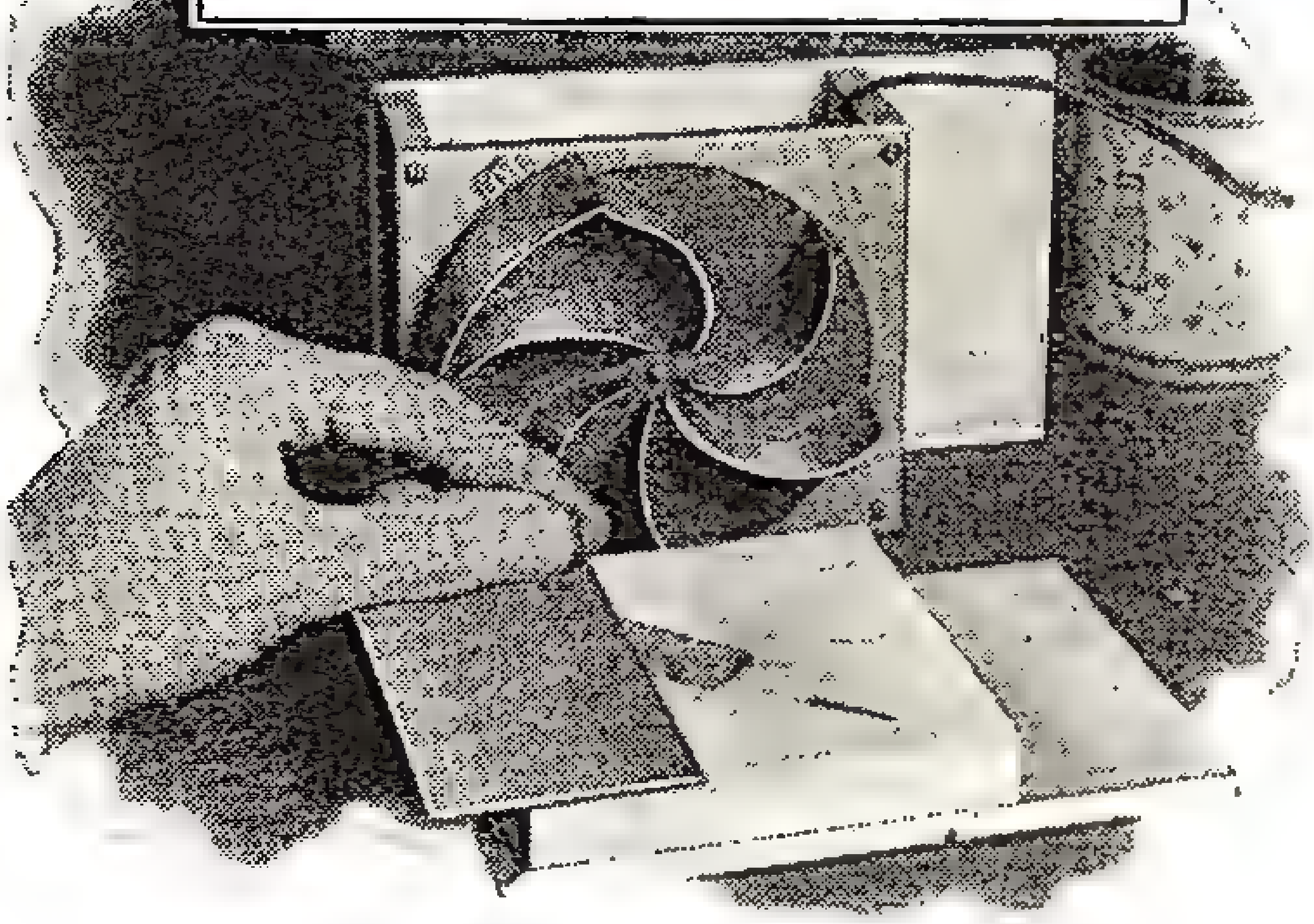
MIDGET Vacuum Sweeper



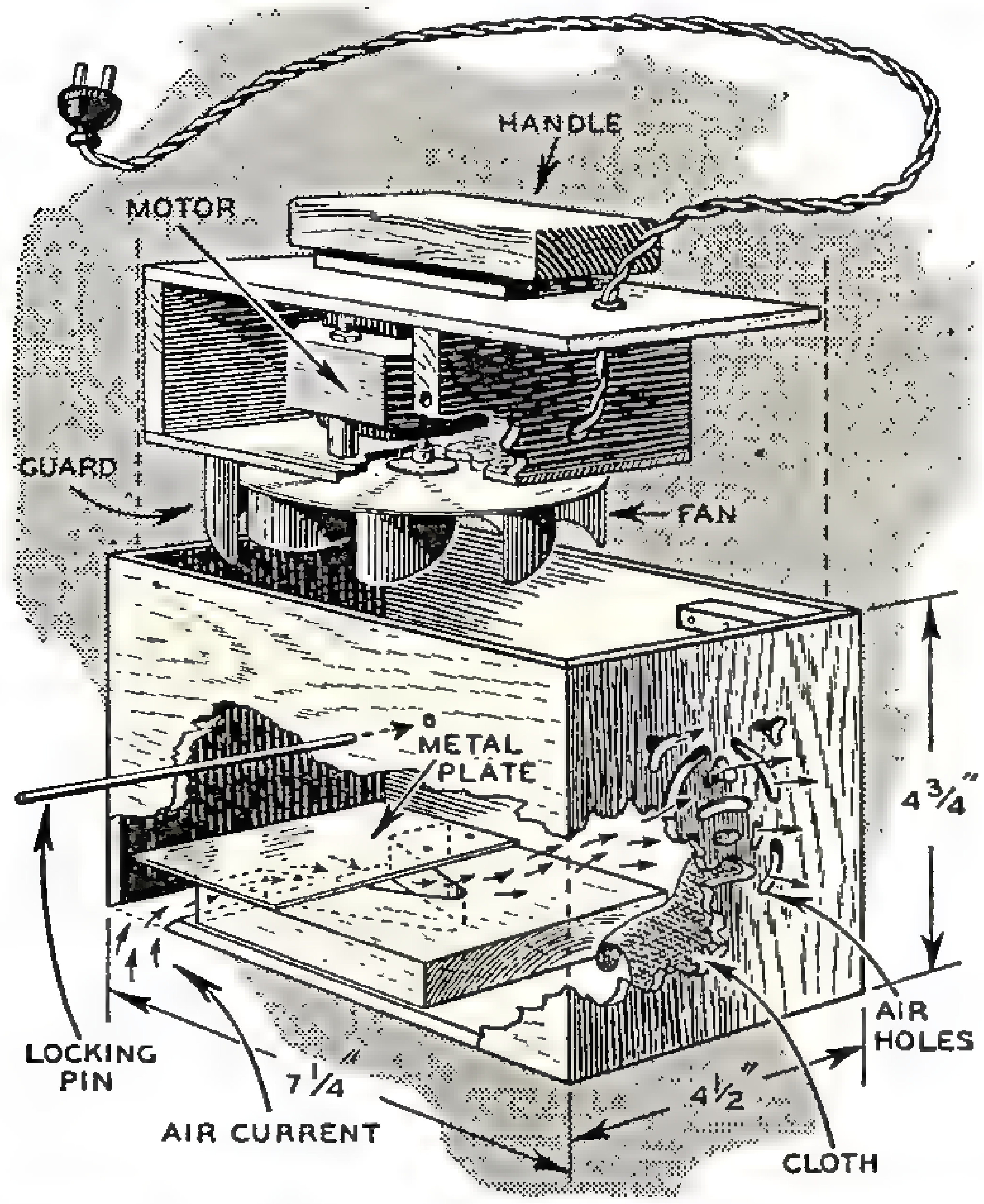
Operating like vacuum sweeper, the little "eater" sucks the table clean of crumbs or clears work bench of shavings.



Blades of fan, curved to a 2-in. radius, are soldered on the brass disc, with the small end in the center. Six blades are placed equidistantly apart.



Here's how to tack the metal plate over the block with the V-shaped notch. End notch comes under the center of fan.



Drawing shows details of the "electric crumb eater."

ALTHOUGH designed primarily for picking up bread crumbs, the midget vacuum sweeper described here has been found useful for a great many things—collecting seeds dropped from bird cages, removing lint from odd corners, gathering up sawdust and chips after home repair jobs, cleaning the shop workbench, and so on.

The motor was part of an electric mixing device obtainable at 25c stores. After the parts of the device were discarded, the motor was mounted on a square piece of ¼ in. plywood just large enough to extend a fraction of an inch beyond the fan edge. This fan is made from sheet iron or brass as illustrated in an accompanying drawing. Cut a disc 3 to 4 in. in diameter, and drill a hole in the center to fit over the motor shaft. Cut six blades to a shape that resembles half of an orange segment when seen from the side. Bend these blades until they are curved to about a 2 in. radius. Solder them at equidistant positions on one side of the disc, the small ends at the center.

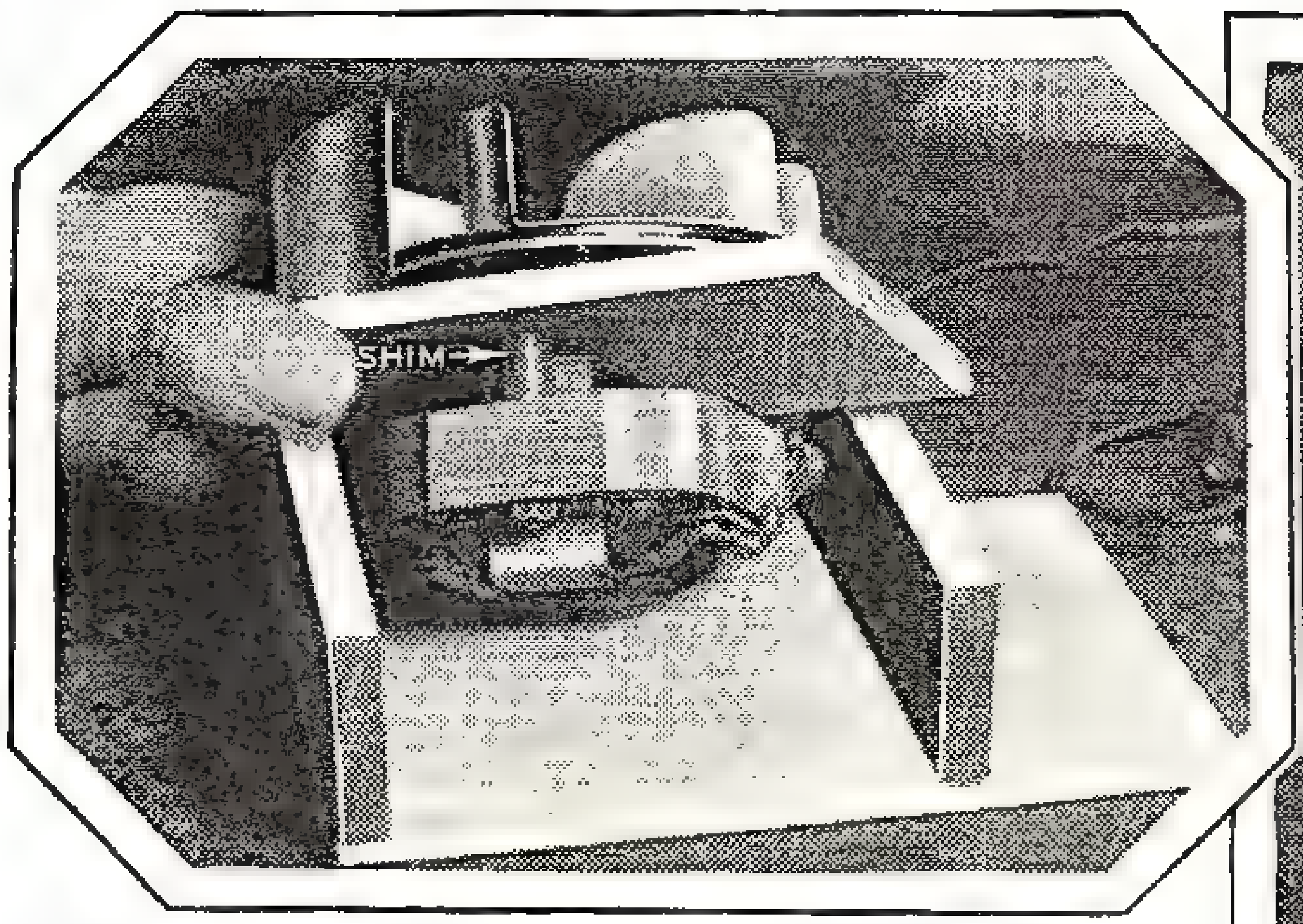
They should be placed so that the convex surfaces are towards the direction of rotation of the fan when mounted on the motor shaft. A collar such as that shown in the drawings, riveted to the disc, is suitable for mounting the fan on the shaft. Now, when the motor whirls the blades, air will be drawn in at the center and thrown out at the edges.

Housing Made From Plywood

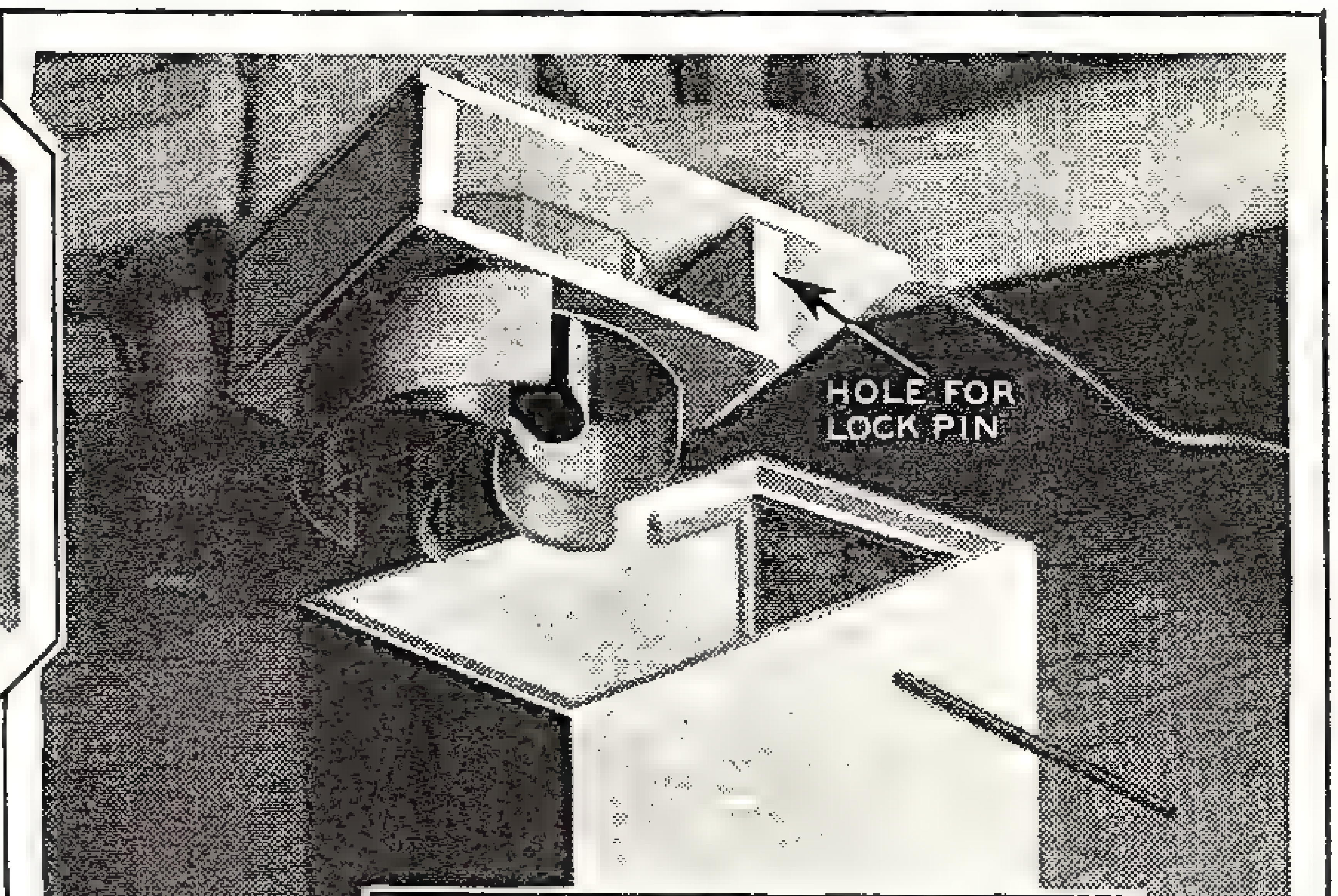
Make the housing from ¼ in. plywood, and miter the vertical corners. Then cut a lid to fit down inside the opening. Mount the motor at one end of the lid by means of two crosspieces connecting the underside of the lid and the motor board.

The crosspieces should be not less than ½ in. thick, because one of them is to have a hole bored through it for receiving a locking pin. The lid fits down inside the box, and is held in position by corner blocks at the rear end. The front end is

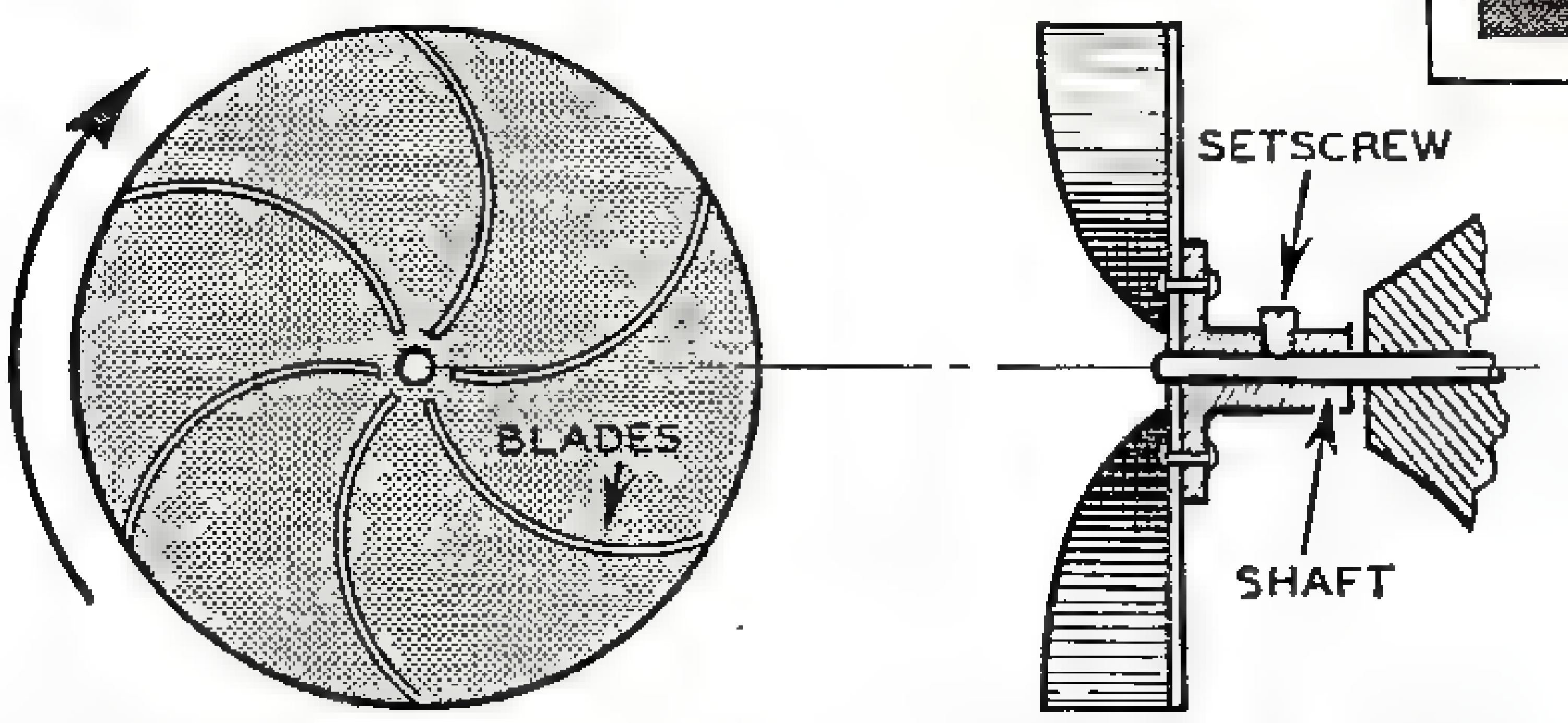
Cleans Table or Workbench



The motor is mounted on a plywood bottom board, which is mounted in turn on two crosspieces.



The top of the crumb eater is removable for dumping out debris collected in the bottom compartment.



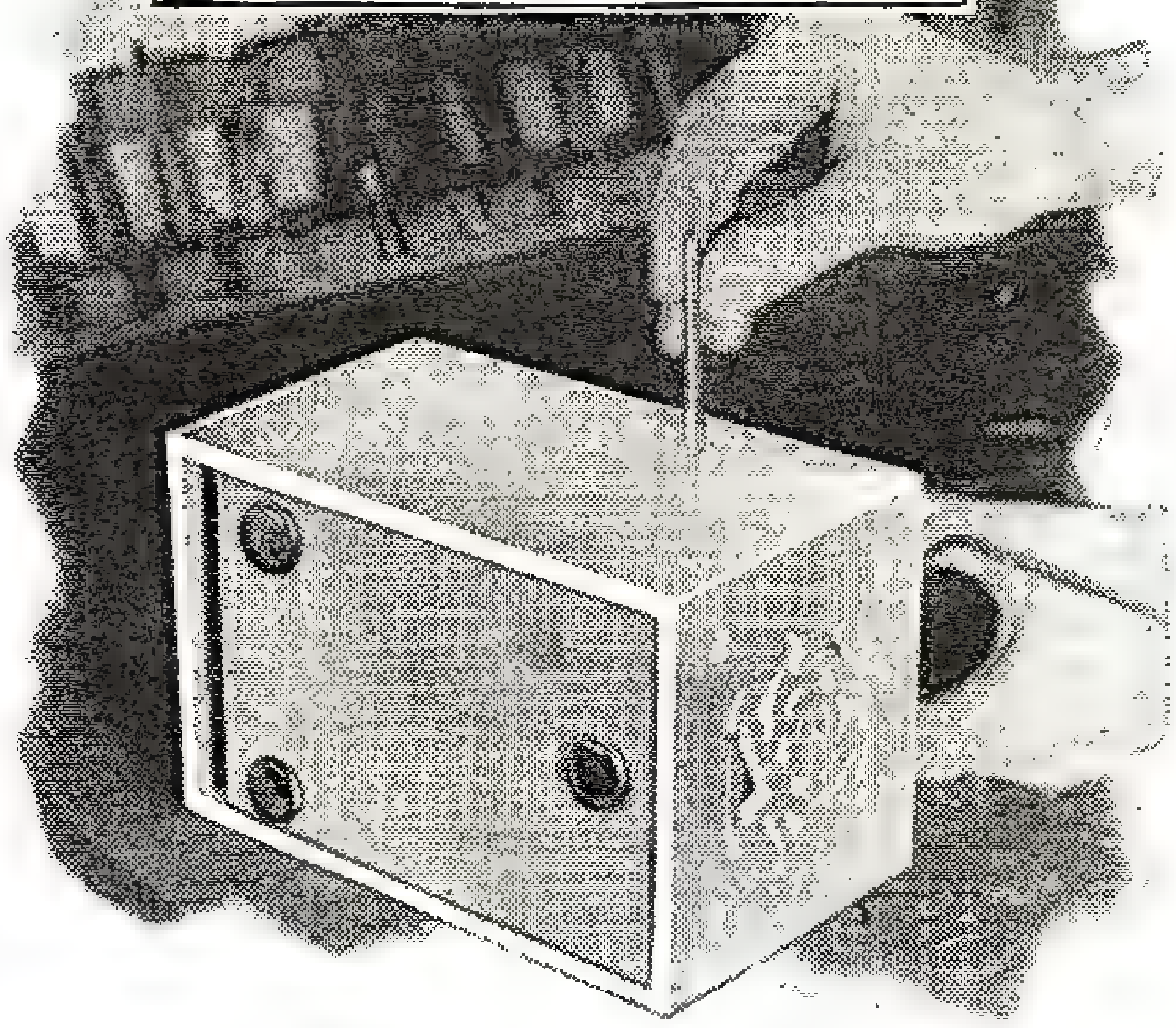
Mount the fan blades on the brass disc in the positions shown here. The disc attaches to the motor shaft by means of a collar, to which it is riveted. Note blade curvature.

supported by a semi-circular metal guard that is fastened in front of the fan blade.

In the rear end of the crumb eater cut out a decorative design with a jig saw. The openings are to permit air to escape, and are covered with a porous cloth that catches dirt but lets the air pass.

Cut, for the bottom, a piece of plywood the exact dimensions of the lid, with the exception that it is about ½ in. shorter. This is to create a slit of "mouth" for the sweeper, at the front end.

Next, make a block long enough to extend back from the slit to a point directly below the rear edge of the motor board. Then cut in it the V-shaped notch shown in the drawings. Next, cut a piece of sheet brass of such size that it will extend from the inside surface of the front end of the box to a point 1 in. from the point of the V, and will go completely across the box from one side to the other. Tack this in place. This assembly, when the bottom is fastened in the box, forms a converging air passage from the slit to the center of the fan.



The top is held in place by locking pin shown above. The furniture slides on bottom do duty as wheels for the "eater" and hold the box correct distance above surface being swept.

After the lid is adjusted so that it fits snugly but does not bind, hold it in place

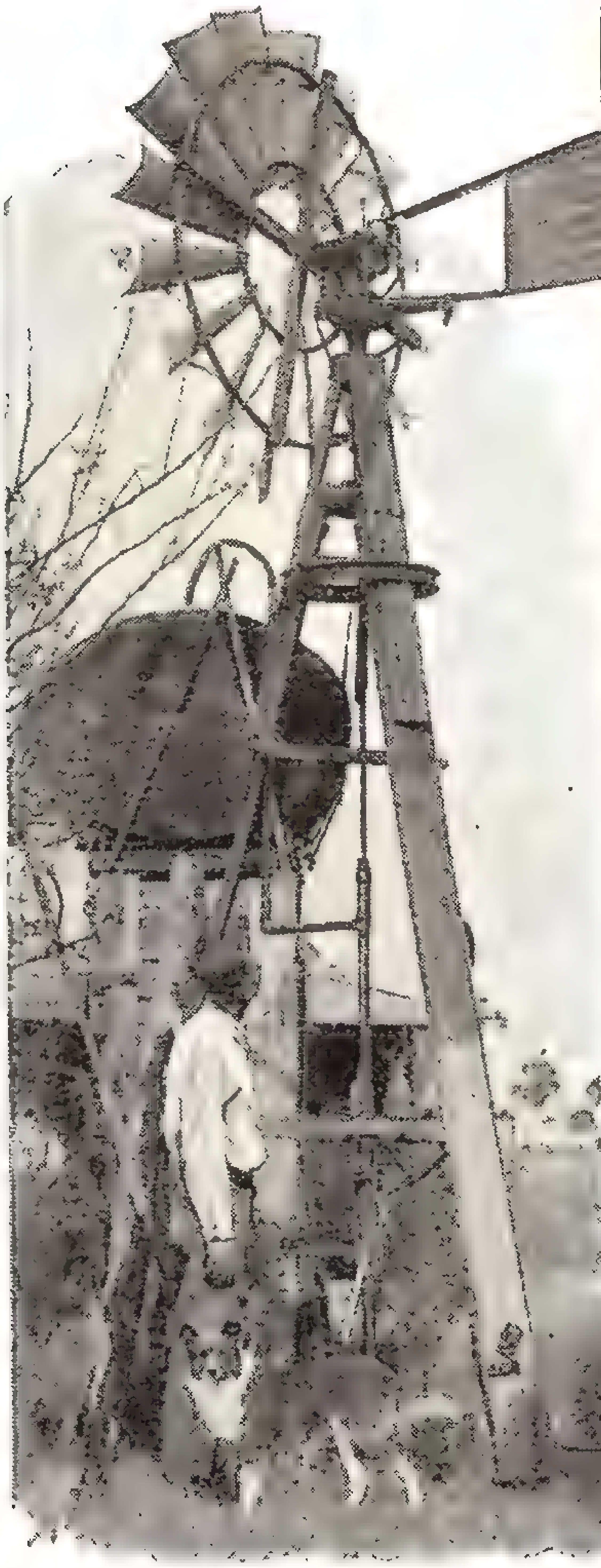
(Continued on page 142)

Smear the vacuum cup with glycerine to strengthen grip.

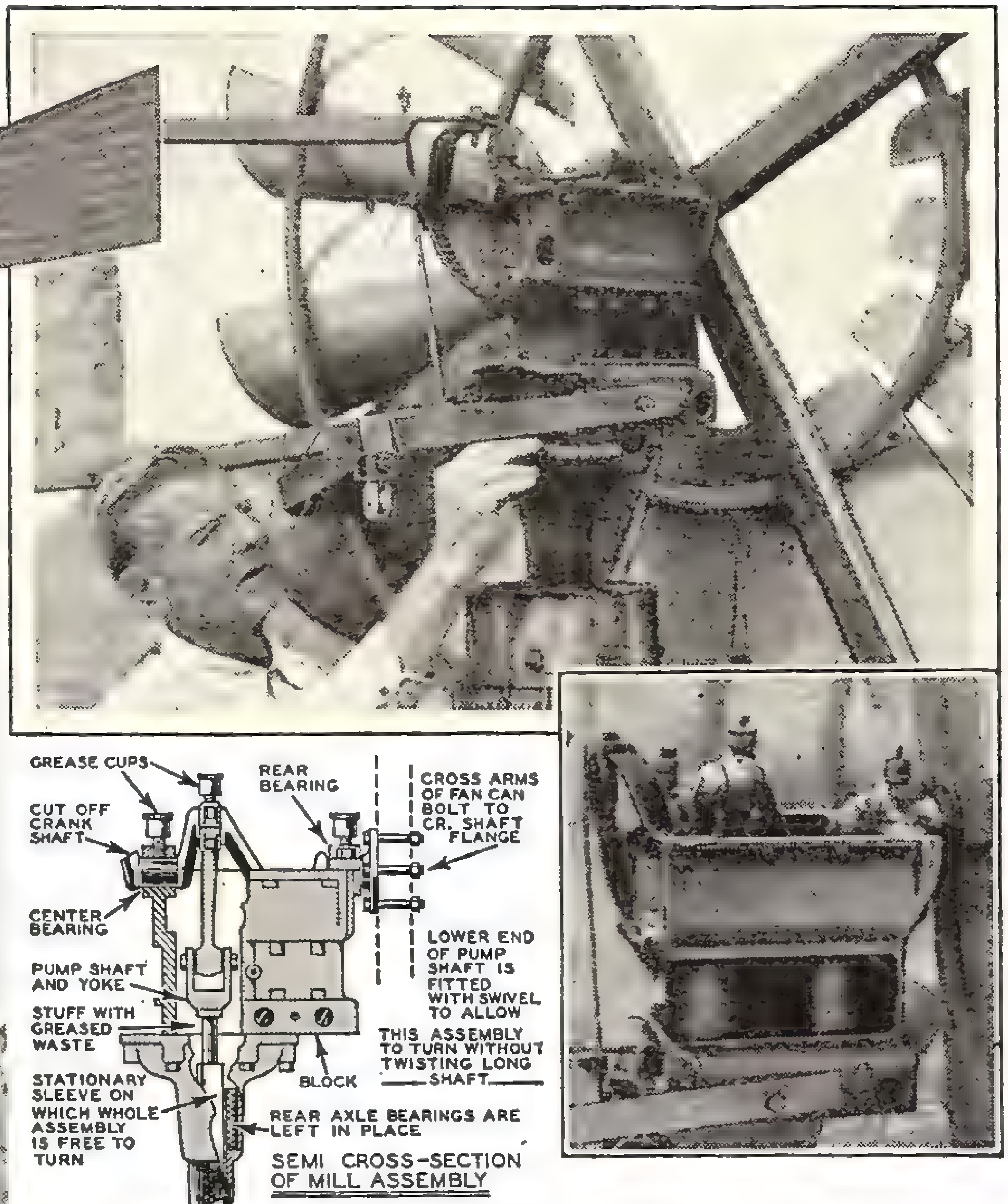
Making Rubber Vacuum Cups Stick

RUBBER vacuum cups have a way of losing their grip and thus becoming almost useless. A way to restore their youthful condition is to smear them with a generous quantity of glycerine, giving especial attention to the edges. Such treatment will improve their flexibility and also their air-tightness. When stuck on a smooth surface they stay put much more firmly than if left dry. Apply a fresh coat of glycerine every once in a while.

Junked Motor Makes Windmill Water Pump



Here is the pump in operation. The vane is constructed from corrugated iron sheeting reinforced with band iron. The lower end of the connecting rod attaches to the pump shaft which comes up through the axle housing.



GREASE CUPS
REAR BEARING
CROSS ARMS OF FAN CAN BOLT TO CR. SHAFT FLANGE
CUT OFF CRANK SHAFT
CENTER BEARING
LOWER END OF PUMP SHAFT IS FITTED WITH SWIVEL TO ALLOW THIS ASSEMBLY TO TURN WITHOUT TWISTING LONG SHAFT
PUMP SHAFT AND YOKE
STUFF WITH GREASED WASTE
BLOCK
STATIONARY SLEEVE ON WHICH WHOLE ASSEMBLY IS FREE TO TURN
REAR AXLE BEARINGS ARE LEFT IN PLACE
SEMI CROSS-SECTION OF MILL ASSEMBLY

Close-up view of the mill at the top shows how vane is attached to the motor, while below is seen the half-section of the motor which is utilized. Drawing illustrates assembly of the parts. Both the cylinder block and the crankshaft are cut in two.

A WINDMILL constructed largely from junked automobile parts is keeping George B. Evans, of Lake Worth, Florida, supplied with water. The mill pumps water from a well into a tank from which it is drawn as needed for watering a garden, and for household use.

In constructing the windmill, the builder procured an old four-cylinder automobile engine. He broke the block in two and mounted one-half, containing two cylinders, in an inverted position on the large end of a rear axle housing that formed the pinnacle of the windmill tower. Then he cut the crankshaft in two and mounted one piece on the engine block.

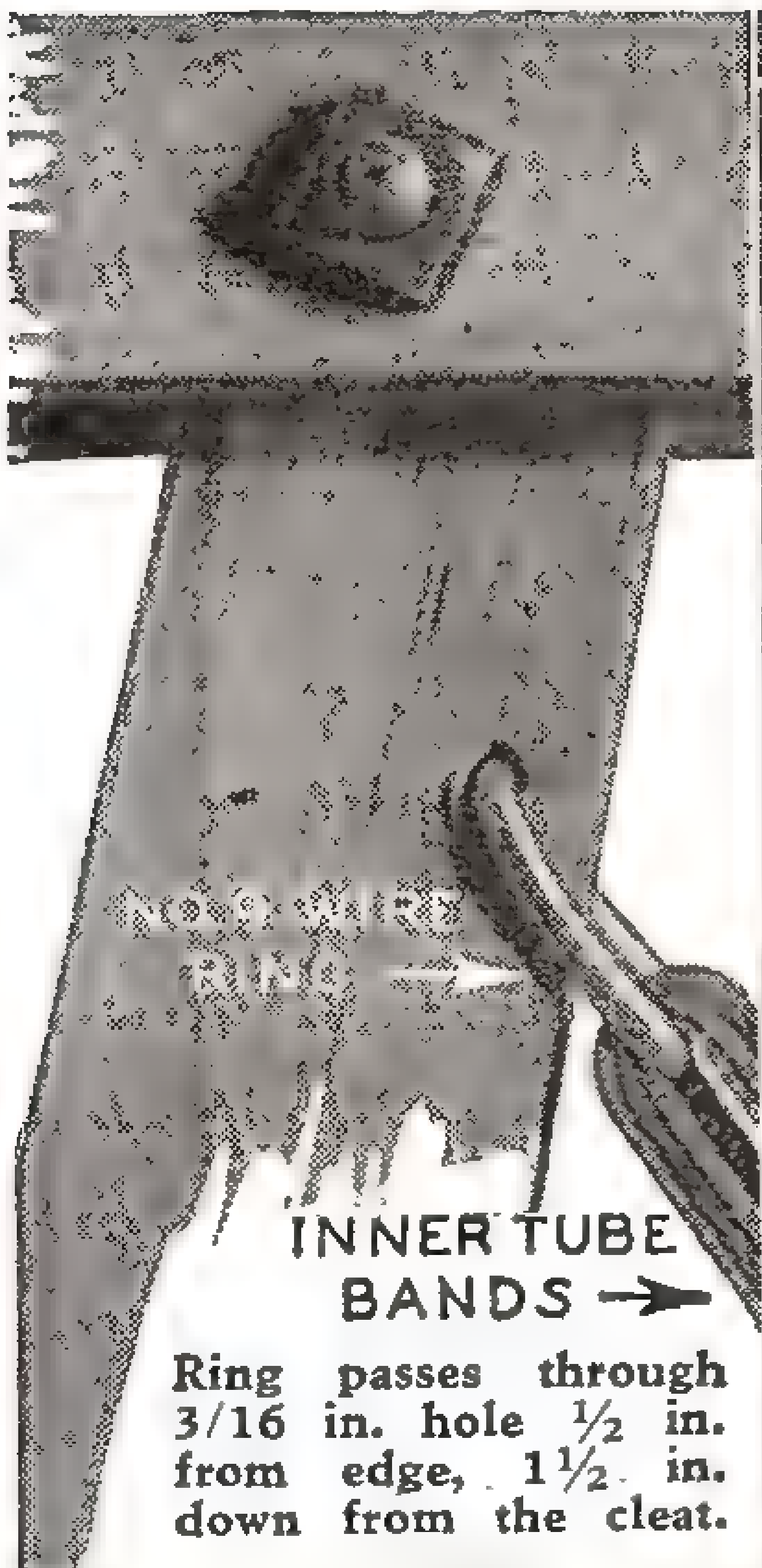
A connecting rod, fitted with a large grease cup for lubricating the bearing, was placed on the shaft, and the other end of the rod attached to the pump shaft that comes up through the axle housing. The wheel, built up of sheet steel segments made from the body of the car, is mounted on the projecting end of the crankshaft section. The vane was constructed from corrugated iron sheeting reinforced with band iron.

Evans found uses for other parts of the old car. One of the wheel rims encircles the wood tower near the top, making a strong brace. The other half of the engine block, crankshaft, connecting rods and the like were sold to a neighbor for use in another windmill.

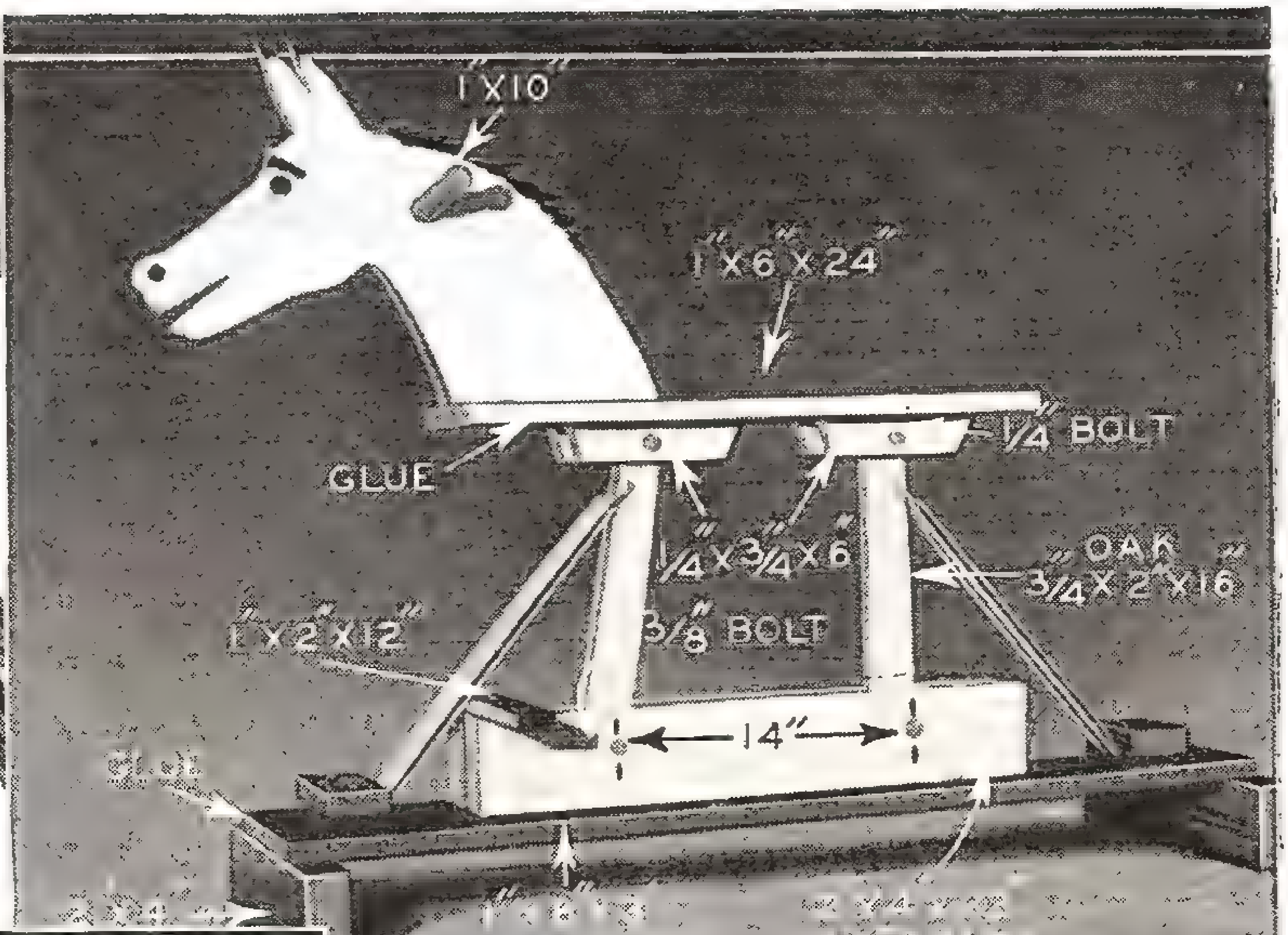
This Florida windmill, operating a small pump with a 4-in. stroke, can fill a 600-gallon tank in two hours. The only attention required other than regulation of the vane is an occasional greasing.

Varnish, paint, etc., no matter how old and hard, may be softened in a few minutes so that scraping is easily done, by applying the following mixture to the surface. Water glass, 5 parts; soda lye, 40° B (27 per cent) 1 part; ammonia water, 1 part. Mix thoroughly, apply with brush, and allow to soak in.

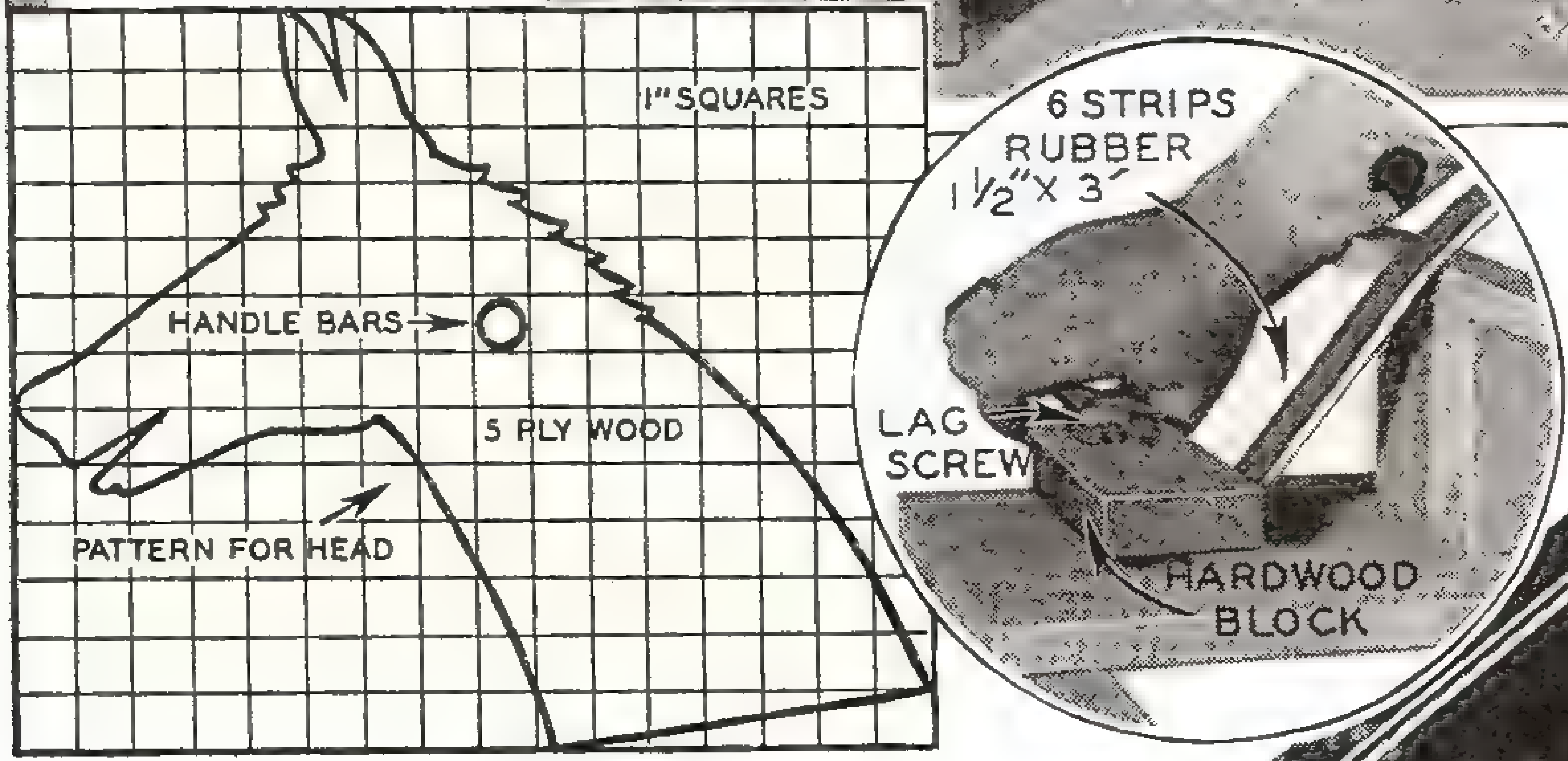
Hobby Horse Rides With Life-like Gallop


NO. 9 WIRE RING
INNER TUBE BANDS

Ring passes through 3/16 in. hole ½ in. from edge, 1½ in. down from the cleat.


1"X10"
1"X6"X24"
1/4 BOLT
GLUE
1/4"X3/4"X6
OAK 3/4"X2"X16
1"X2"X12"
3/8" BOLT
14"

Dimensions of all parts for horse are seen here. Joints are reinforced with glue.


1"SQUARES
HANDLE BARS
5 PLY WOOD
PATTERN FOR HEAD
6 STRIPS RUBBER 1½"X 3'
LAG SCREW
HARDWOOD BLOCK

Cut out the head to this shape and bore hole for the handlebar. Insert shows the 3x5 hardwood block which anchors the rubber strips to the baseboard. Lag screws are one-half by two and one-half.

RIDING this home-built hobby horse is exactly like riding a real flesh and blood animal—the motions are almost the same. Six rubber strips 1½ in. wide and 3 feet long cut from a heavy discarded inner tube provide the animation and counteract the weight of the rider as he moves from one extreme position to the other.

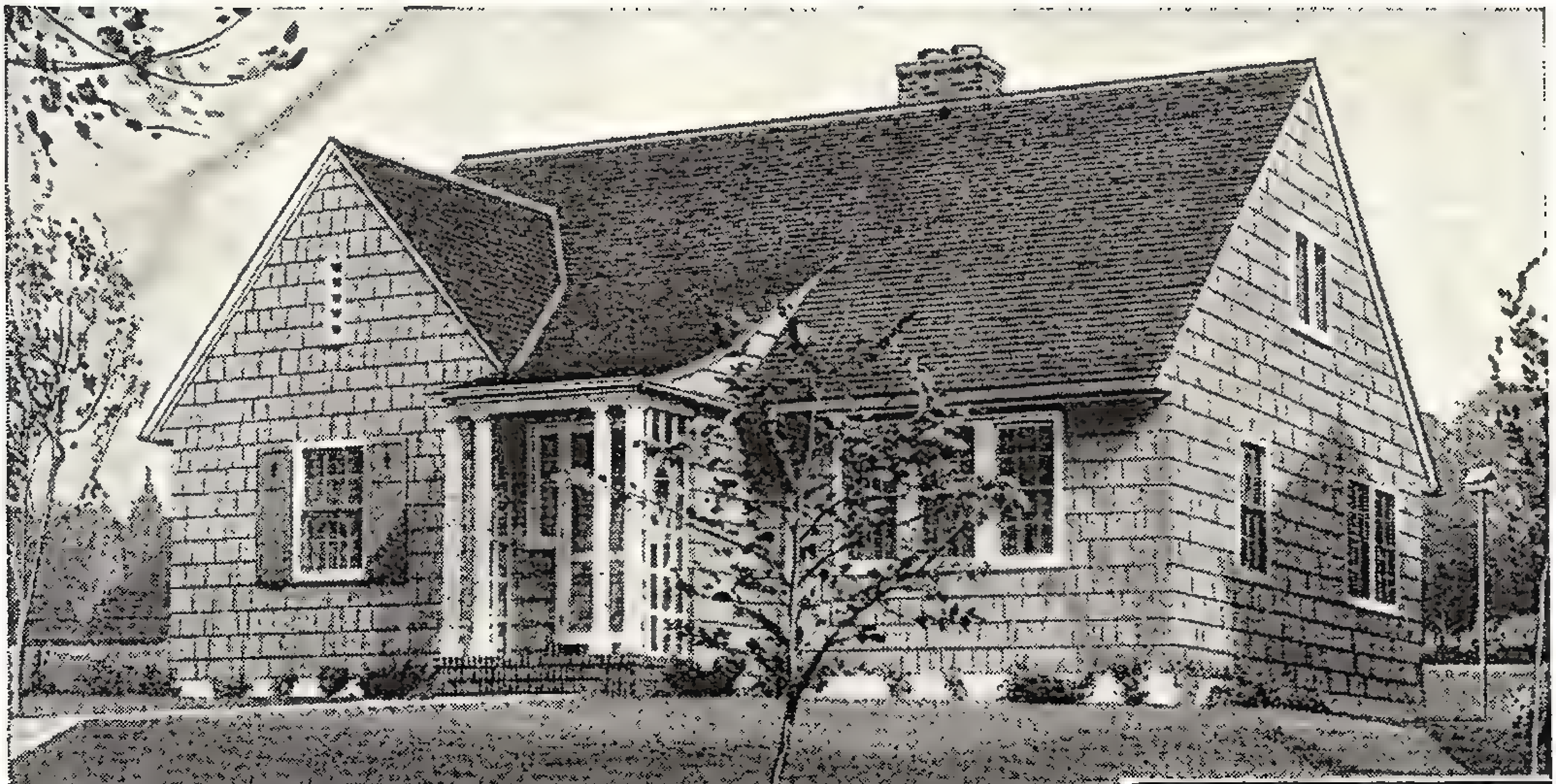
Dimensions of all necessary parts are given in the accompanying drawings. Note that the rocker arms are of oak. These are 2 in. wide at the bottom and 1½ in. at the top, have their ends rounded, and are set 14 in. apart at the bottom and about 12 at the top.

Adjusting the tension of the bands might prove a delicate job. Start the 2½ in. lag screws through the holes in the anchor blocks, which are centered at the ends of the frame bottom, and draw the ends of the rubber strips underneath until each are of equal tension. Then turn the screws down tight. Each set of strips should be barely taut.

Suit yourself about the color scheme. If there is any rubbing at any point apply a little grease, especially at the ends of the rocker arms.

Here's how you ride the hobby horse—your hands on the bars and your feet on the foot rest.

DREAM House for Technocratic AGE



Unusually attractive in appearance and design is the house built from plan No. 5-W-10, shown here. Its chief advantage is that you can leave development of the two extra bedrooms on second floor till later, when money is available.

TECHNOCRACY may, in its readjustment of gainful occupations and adequate pay therefrom, prove housekeeping as much of a job for men as for women. If that time ever comes man will demand a smaller house which requires a minimum of work.

And that's why the little house No. 5-W-10, illustrated above, should appeal to men and women who want plenty of time for play. This house is not only good to look at externally, but in plan, equipment and labor saving it's a model from several points of view.

First, it is a house that can grow. That's important these penny splitting days. You can finish the first floor; enjoy complete bungalow equipment and later, if you wish, you may finish the second floor, which is large enough for two extra bedrooms. Remember that most buyers generally ask for three bedrooms.

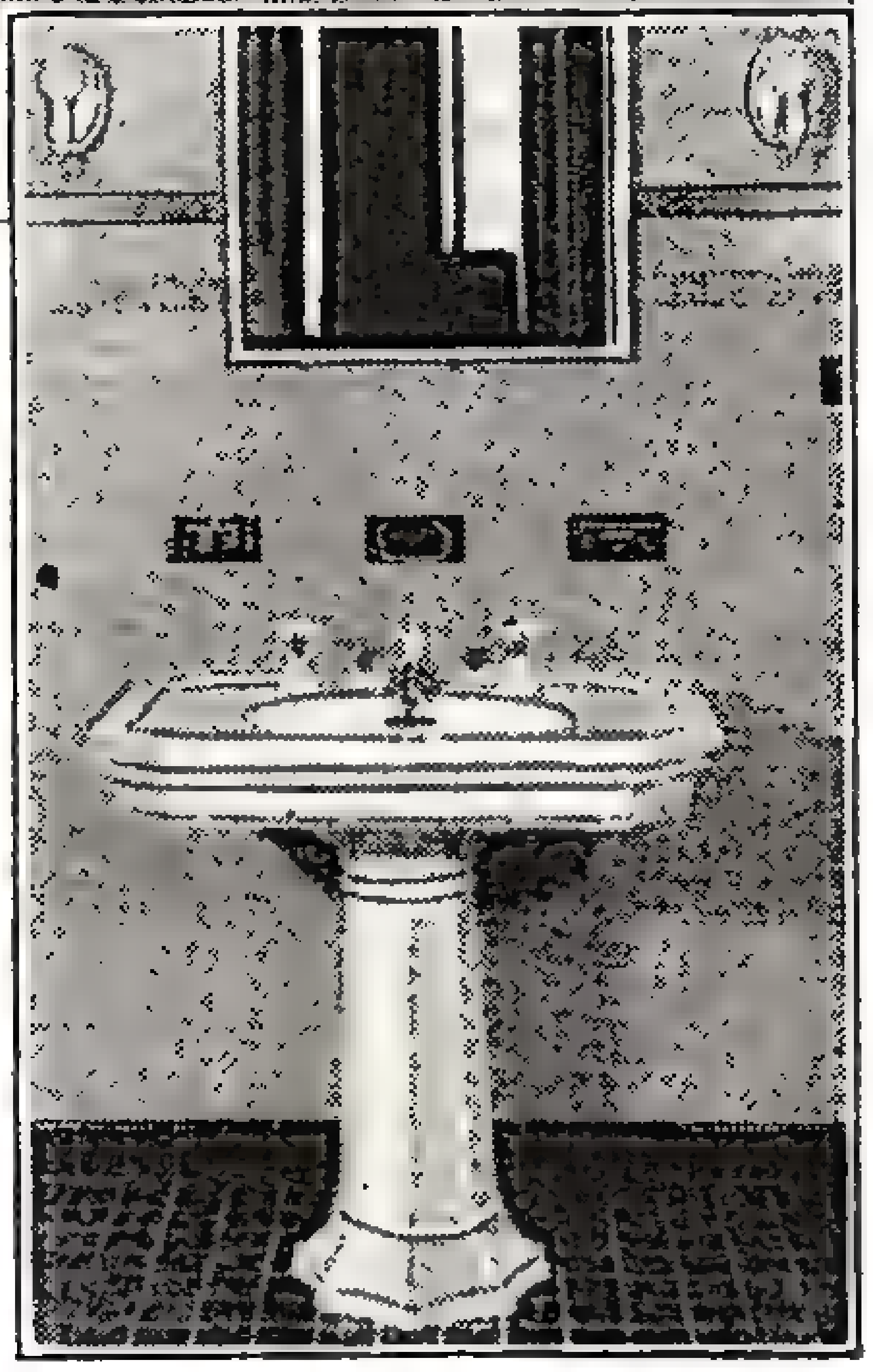
Study the plan. Note how every inch of space has been used to deliver a larger amount of service. An inside fireplace is a stroke of economy. There are sixteen windows on the first floor—which means plenty of sunshine, light and ventilation.

A spacious living room opens onto a dining room, thus increasing the apparent size of both. There's a modernistic bathroom, an efficiency kitchen with plenty of cupboard space and two fine bedrooms on the first floor. In all there's a possibility of four bedrooms in this house.

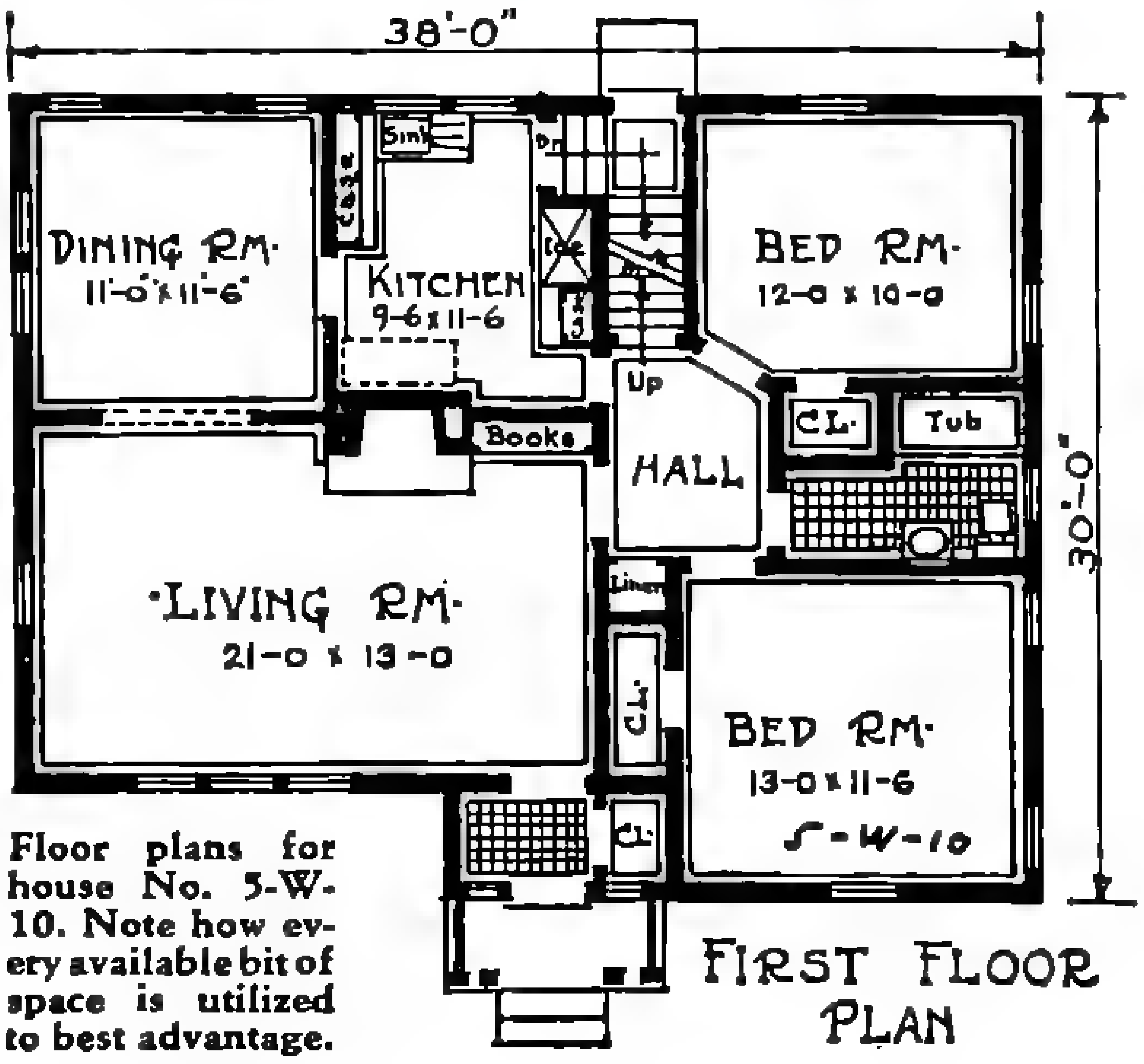
The house is frame construction with shingle sidewalls and shingle roof. This is the least expensive type of construction.

HOW TO GET BLUEPRINTS AND PLAN BOOKS

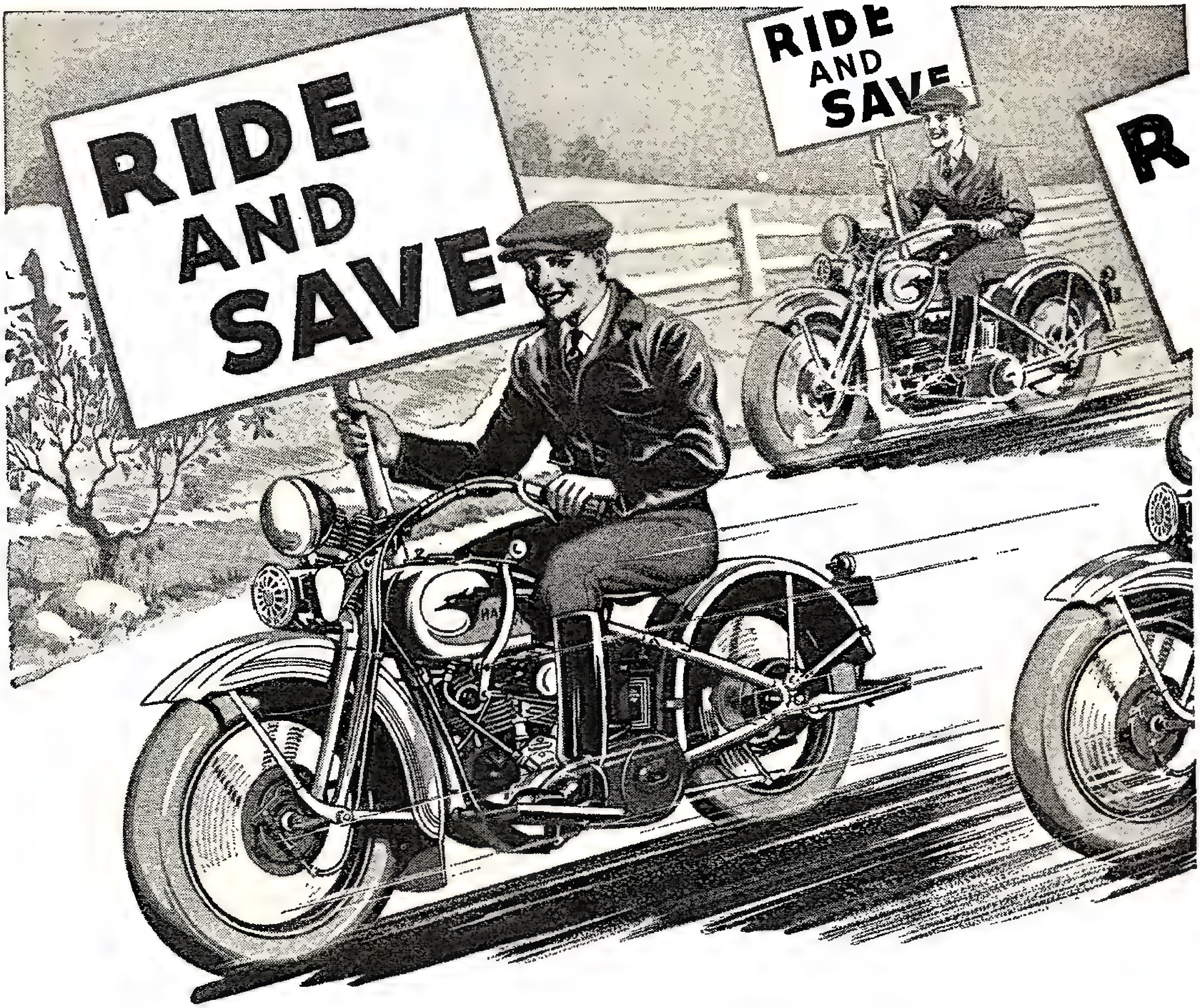
A one-sheet blueprint of any house appearing in Modern Mechanix and Inventions magazine may be had for $1.00, postage prepaid. Two new plan books, "Homes for Newlyweds," containing 32 of the latest ideas for low cost homes, and "16 Selected Homes for Lean Purses" containing time, space and labor-saving bungalows, may be had for 15 cents each, or both books for 25 cents, postage prepaid. Address Home Building Editor, Modern Mechanix and Inventions.



Modernistic bathroom fixtures save space and enhance charm of home.



Floor plans for house No. 5-W-10. Note how every available bit of space is utilized to best advantage.



RIDE A MOTORCYCLE—because it's wonderful sport—because it's healthful and sensible—because it saves money, saves time, saves energy.

Join the Jolly Riders in their evening spins, club runs, and glorious vacations. Harley-Davidson enthusiasts all, eager to welcome you into their fraternity of sport. Nobody has a better time—and it costs so little!

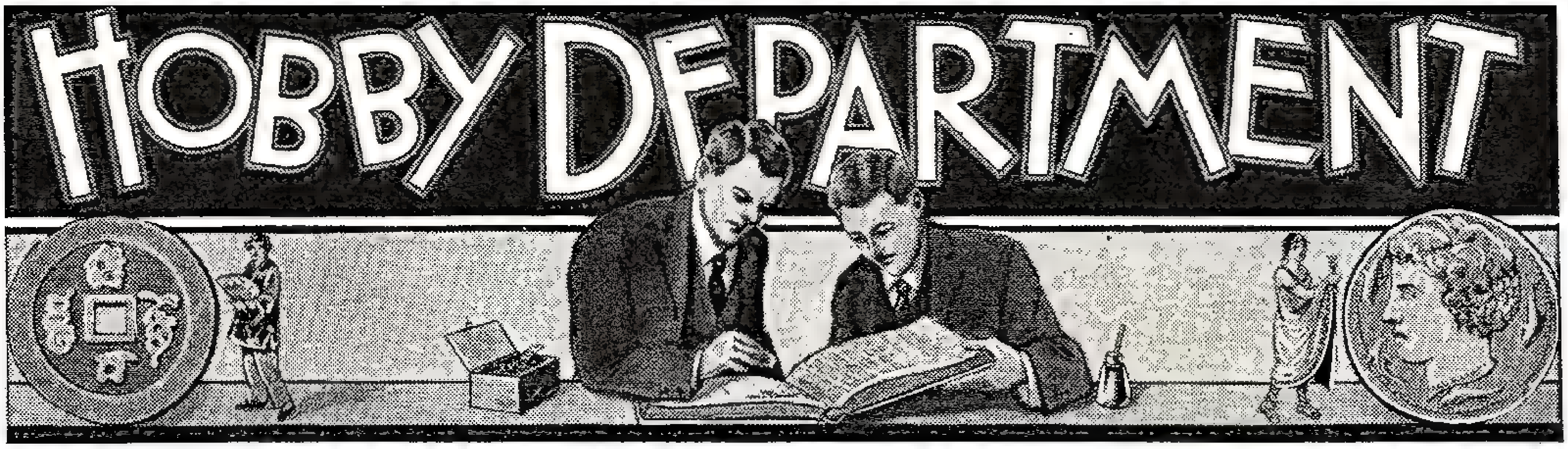
See for yourself how easy it is to own a Harley-Davidson—how low its upkeep is—and how much time and money it will save you.

Ask your nearby Harley-Davidson Dealer about his Pay-As-You-Ride Plan—and mail the Coupon for free literature.

Ride a
HARLEY-DAVIDSON

MAIL THIS COUPON

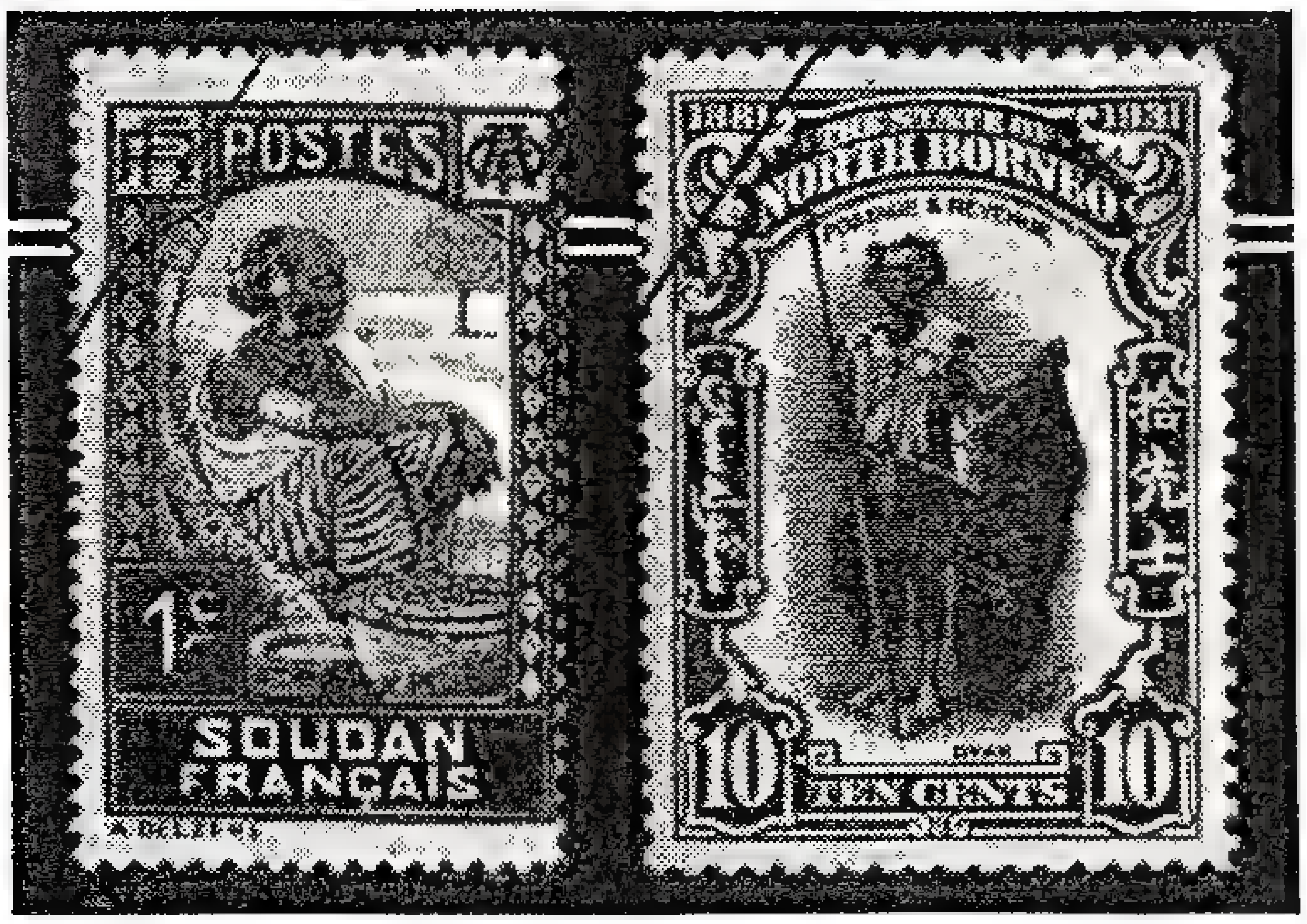
HARLEY-DAVIDSON MOTOR CO.
Dept. MM, Milwaukee, Wis.
Interested in your motorcycles. Send literature.
Name..
Address..
My age is ☐ 16-19 years, ☐ 20-30 years,
☐ 31 years and up, ☐ under 16 years.
Check your age group.



What Price Condition?

PRICE is a factor, as it bears on stamps, which concerns every collector. Catalog values serve as a handy scale in making estimates of the dollars and cents worth of a collection, but it is a well known fact that frequently stamps sell for but a fraction of their catalog value.

The answer, of course, is simple—the condition of the individual stamp has everything to do with the price it brings. Factors bearing on condition are numberless. For one thing, there is the matter of proper centering. Note how the Soudan stamp at the left below is cut into by the perforations along the right edge, and compare it with the perfectly centered example alongside it.



Examples of a poorly-centered and well-centered stamp.

A Brazilian Rarity

REVOLUTION in South America has brought out a series of stamps from a "nation" new in the world's issues—the State of Sao Paulo. This is the great coffee-growing province of Brazil which rebelled against the mother country not long ago. Cut off from the central government, it devised its own stamp issues, one of which is reproduced herewith. Locally designed and printed, the eleven values of the issue are rather inferior in execution, but no less interesting on that account. When the Sao Paulists were subdued by the Brazilian government, the stamps were officially recognized and permitted to be used throughout the republic until Oct. 31.

CORREIO DO
BRASIL

Portrait of Christ on Coin

ONE of the few portraits of Christ ever used on a national currency appears on a Byzantine coin dating from 650 A. D., reproduced herewith. An additional feature of interest is the fact that the coin is cup-shaped, the photograph showing the piece from what would be the bottom angle—i.e., the edges around the circle of the design are bent inward on themselves to shape a cup-like depression on the other side. The portrait of Christ is distinctly Byzantine in treatment; in fact, accustomed as most of us are to the conception handed down by religious artists of the middle ages, the portrait is at first glance difficult to recognize for what it is. Byzantium was the Eastern Roman Empire which flourished from 300 to 1450.

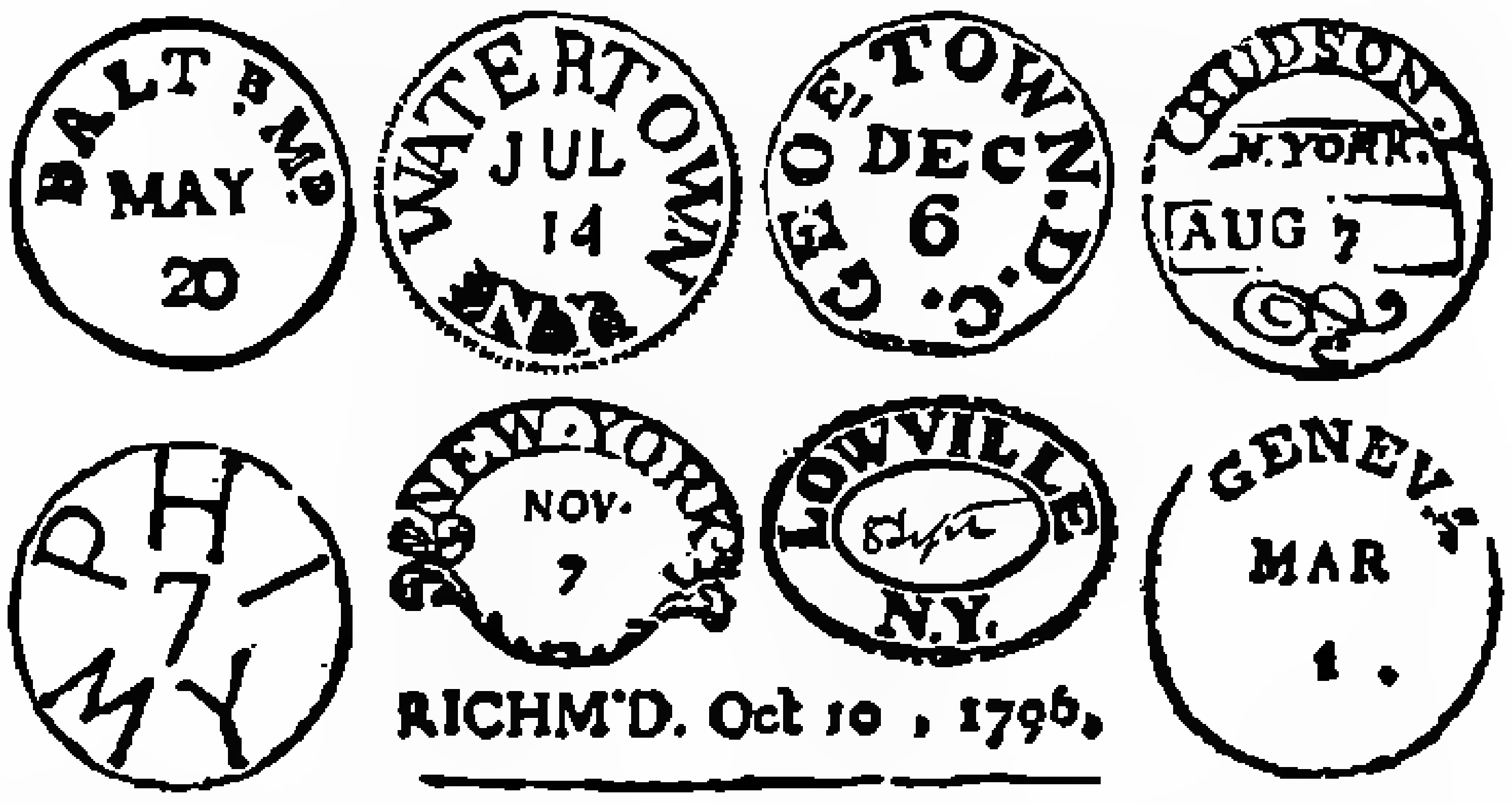
Rare Postmarks in Find

THIRTY thousand letters, accumulated in the period between the Revolutionary and the Civil War, were recently unearthed in the pre-revolutionary home of Nicholas Low in New York. They were contained in trunks in an attic which had been walled up years before, and its existence forgotten.

News of this find, which is now being valued by a New York philatelist, will no doubt stimulate a rush on old houses which may have sealed-up attics, on the part of the collectors.

Since postage stamps were a comparatively late development in the postal system, most of the covers found are franked with postmarks or with the signatures of

(Continued on opposite page)



In early Colonial days postmarks served as stamps.

New "Delta" Scroll Saw

Earns Thousands of Dollars for Puzzle Makers

For spare time, full time, or hobby—you, too, can use this remarkable new "Delta" tool to "cash in" on tremendous demand for jig-saw puzzles. Starting with one saw, some "Delta" users have as many as 50 units going at full speed. Offers many other opportunities for woodworking for pleasure or profit.

Send Coupon for Full Details

New and radically different from any Scroll Saw on the market. At 1,800 strokes per minute the "Delta" Scroll Saw has such perfect balance, such absence of vibration, that a pencil can be stood on end on the saw table without tipping over. This is the only Scroll Saw of this type on the market today that can pass this rigid test. Produces smooth, accurate work. Has many special features. The New "Delta" Scroll Saw can also be used for filing, sanding, and honing.

10-Day Trial

Easy Terms "Delta" Tools are always available for 10-day Trial without the slightest risk. Satisfaction guaranteed. For full details of this liberal offer, also Easy Payment Plans and FREE copy of illustrated 1933 "Delta" Catalog, send the coupon below—TODAY! No obligations!

DELTA MFG. CO., 3775 North Holton Street
Dept. M-533, Milwaukee, Wisconsin

A Complete Line of Modern Motor-Driven Tools

"Delta" Woodworking Units are available in a large variety of combinations, and at prices to fit all needs. The "Delta" line includes Jointers, Circular Saws, Band Saws, Scroll Saws, Wood-turning Lathes, Drill Presses, Boring, Routing, Sanding, and Mortising Attachments, and a complete line of accessories.

Send Coupon for
FREE CATALOG

DELTA MFG. CO., 3775 N. Holton St.
Dept. M-533, Milwaukee, Wisconsin

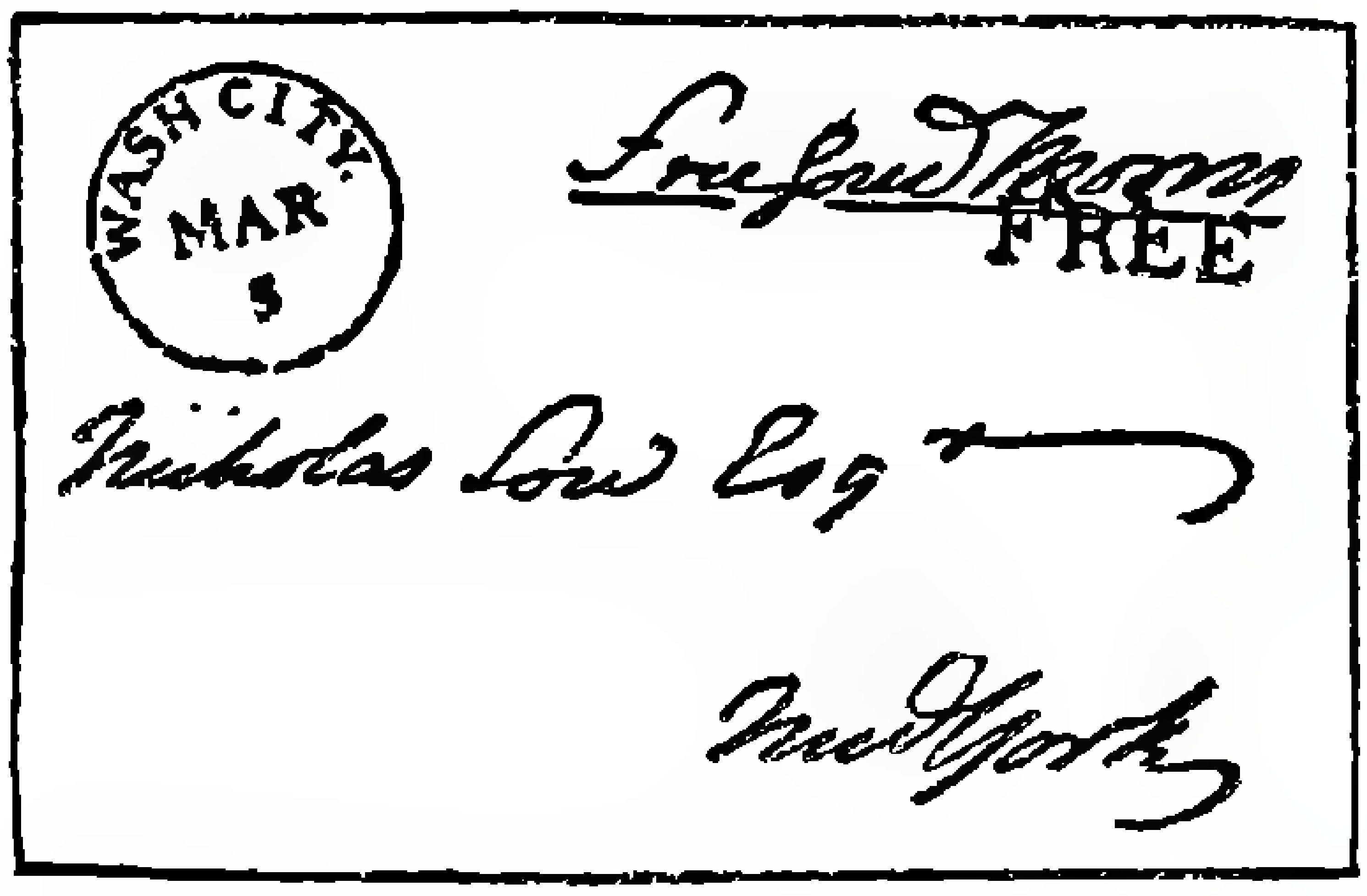
Please place me, without obligation, on mailing list to receive the FREE 1938 "Delta" Catalog of Quality Woodworking Tools. Also send full details of your 10-Day Trial Offer and Easy Payment Plans.

Name...Age?..........
Address...
City...State..............

HOBBY DEPARTMENT

local postmasters. A series of typical postmarks is reproduced herewith, together with a letter bearing the signature of Gouveneur Morris, who, as a member of the Continental Congress, had the privilege of sending his mail free.

Postmarks date back to 1692, when the Massachusetts General Court enacted legislation compelling every letter received at the postoffice to be marked with a print showing the date of re-



WASH CITY
MAR
5

FREE

Nicholas Low Esq

New York

This old cover bears the signature of Gouverneur Morris, who, as member of the Continental Congress, had the privilege of sending mail free. Frank is in upper right corner.

(Continued on page 134)

HAENEL "100 SHOT" REPEATER

$4.95

Latest Model 1933 Haenel repeating pistol. Sturdy, massive construction, easy cocking lever, 100 shot magazine. Accurate for target. Powerful for small game. Blue or Nickel finish, shoots B. B. steel shot. Weight 18 oz. Price with 500 shots Free - $4.95—$2.00 deposit on C.O.D. *Free Catalog—Colts, S.&W. Rifles, Binoculars, etc.*

HUDSON SPORTING GOODS COMPANY
M-52 Warren Street New York City, N. Y.

WONDERFUL NEW INVENTION

SOLDERING IRON AND BLOW TORCH IN ONE

Pays for itself in one job! Needs no pump or pressure system—no stove—no charcoal—no separate blow torch. Burns an hour at less than ¼ cent for gasoline.

AGENTS' OFFER

Write for Special Offer to agents. The Justrite is an ideal proposition for either main line or side line—full time or spare time.

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2047 Southport Avenue,
Chicago, Ill.

Students Individually Instructed

Learn Autos
IN LOS ANGELES

A FEW SHORT WEEKS AT NATIONAL AND YOU'RE READY FOR A BIG PAY JOB!

For 28 years National has quickly helped men get ready for good pay jobs, steady employment in the profitable auto fields. More repairs now than ever before. Don't worry about previous experience or whether you're too old or too young. We train you by "actual shop" methods on newest equipment--late model autos. Largest School in West.

Complete Practical Auto Instruction
Course trains you in every branch of auto repair, qualifying you to run your own shop or accept good job. Don't worry about money. We'll help you secure part-time job to earn room and board while learning. Unlimited free Employment Service to graduates. Coach railroad far allowed to Los Angeles.

SPECIAL
High Speed Diesel Engine Course — now being ADDED
Send for Free Book

NATIONAL
AUTOMOTIVE SCHOOL
Los Angeles

Dept. MMA-5, 4006 South Figueroa St.
Send Free Auto Book and Special offer.

Name..
Address..
City........................ State..............

Your Future Assured
National Automotive
Los Angeles

LIGHT PLANE BUILDERS—The 1933 Flying Manual is 50 cents postpaid. 529 S. Seventh Street, Minneapolis, Minn.

Now You Can Have A New Skin In 3 Days' Time! Visible Ugly Blemishes Vanish!

PIMPLES
BLACKHEADS
FRECKLES
BLEMISHES

GET THIS FREE

—and learn that what was considered impossible before—the removal of pimples, blackheads, freckles, tan, oily skin, large pores, wrinkles and other defects in the outer skin—can now be done harmlessly and economically at home in three days' time in many instances as stated by legions of men and women, young and old.

It is all explained in a new treatise called

"BEAUTIFUL NEW SKIN IN 3 DAYS"

which is being mailed absolutely free to readers of this magazine. So worry no more over your humiliating skin and complexion or signs of aging if your outer skin looks soiled and worn. Simply send your name and address and name the skin blemishes which trouble you most to MARVO BEAUTY LABORATORIES, Dept. 343, No. 1700 Broadway, New York, N. Y., and you will receive this amazing new treatise by return mail in plain wrapper, postpaid and absolutely free. If pleased, tell your friends about it.

HAIR Trouble?

Learn the one correct and harmless way to remove all dandruff and any itch from the scalp; how to stop excessive hair loss, and how it is possible to grow back the lost hair. A famous scientist explains everything in a free booklet. Write

LINDAY, 361 W. 29th Street, New York City

Name ....
Address ....

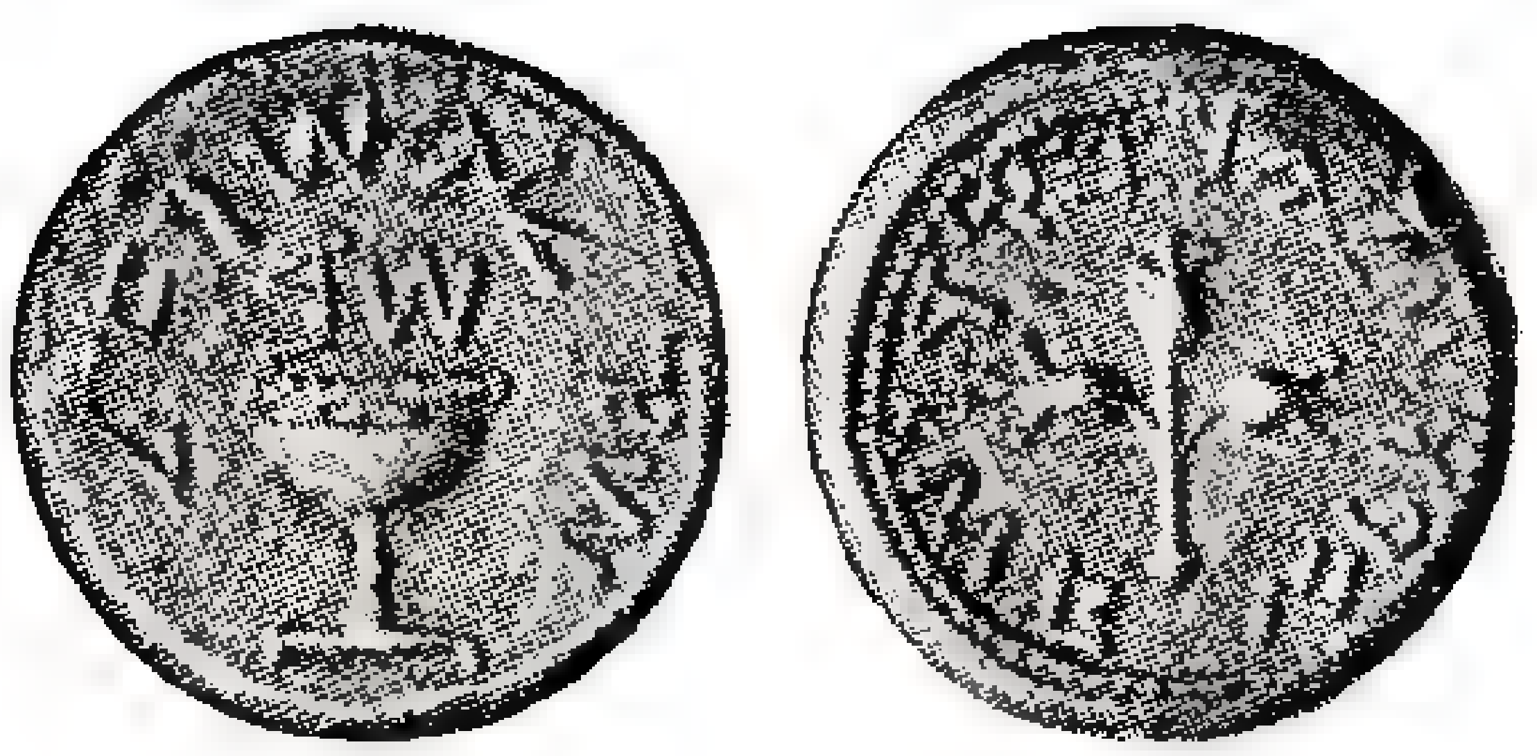
HOBBY DEPARTMENT

(Continued from page 133)

ceipt. The use of postmarks brings to mind the realization that letters had to be mailed directly at the postoffice, involving a cash transaction with the postmaster. Not until the postage stamp came into general use were such conveniences as mail-boxes on every corner made possible.

What a Shekel Looks Like

THE slang habit of using the word "shekel" as a synonym for money has made the term a familiar one, but not many people have actually seen a real shekel, or realize that it was a Jewish currency which has gained familiarity through Bible references. Note that there is no living image on the coin, the Jews obeying the injunction against "graven images" even in their coins.



Jewish silver shekel which passed current in 133 B. C. Note absence of graven images on coin.

Explanation of Nic Sprank's Oddities of Science

THIS is the manner in which ice can be made in a red-hot vessel: Heat a platinum burner red hot and pour in some sulphuric acid, which will be found to become completely fixed in the hot crucible. Not a drop evaporates, since it is surrounded by an atmosphere of its own, and does not, in fact, even touch the sides. A few drops of water are now introduced, causing the acid to come in contact with the sides of the crucible and to fly off in sulphurous acid vapor so rapidly that the heat of the water passes off with it, causing the drops to fall to the bottom as ice, where, of course, they are swiftly melted unless removed immediately.

The rate of vibration of a pendulum varies according to the pull of gravity; consequently the rate of swing can be computed into the height at which the pendulum rests.

Two 500-lb. weights, placed one on top of the other, will not weigh as much as a single 1,000-lb. weight of proportionate shape, since their center of gravity is further from the center of the earth, and weight varies with that distance.

Since a boat displaces an amount of water exactly equal to its own weight, it is obvious that a vessel passing over a canal carried by an aqueduct imposes no additional weight on the structure.

In chemical laboratories, water has been cooled to —90° Centigrade (—130° Fahrenheit) without freezing, as long as it was kept absolutely without motion. At these temperatures, however, if the water is slightly jarred, it will instantly turn to ice.

The speed of high explosives has been proved out in the manner described by tests of the British Government Ordnance Department.

When Gold Is Found, Sluice 'er Out!

(Continued from page 50)

with heads not driven down flush. Easy pulling nails may aid clean-up. Where gold is very fine, burlap or carpet or cocoa mats sometimes are substituted for ordinary riffles, either throughout the length of the sluice or at the lower end, the mat being held to the bottom of the box by wire netting.

Worn-out sluices sometimes are burned and gold washed from the ashes. Mercury can be put back of riffles where "flour gold" is found. Care must be exercised or the "quick" will be washed away or lost at clean-up. Several sluices can be rigged up in series if necessary. Sluices run up to 5' deep and to 6' wide on larger operations. On smaller sluices the hopper and screen sifts out and rejects larger worthless pebbles; in larger sluices this primary sorting is not so necessary.

The "Long Tom" is an adaptation of the sluice. The whole first section is a washing-sorting box. Finer materials are washed through the screen at the lower end of this section while larger, worthless rocks are raked or shoveled out. Often a second riffle section is placed below the first, sometimes a third is used. By panning the "tailings" below sluice or tom you can determine if the outfit is catching all the gold. When gold is fine and a tom is used the lower riffle boxes sometimes are lined only with mats. These can be washed out in a tub to recover the gold, or burned carefully. The tom requires less water than a sluice and two men can handle up to 6 yards per working day. Sluices are preferred to toms if there is enough water.

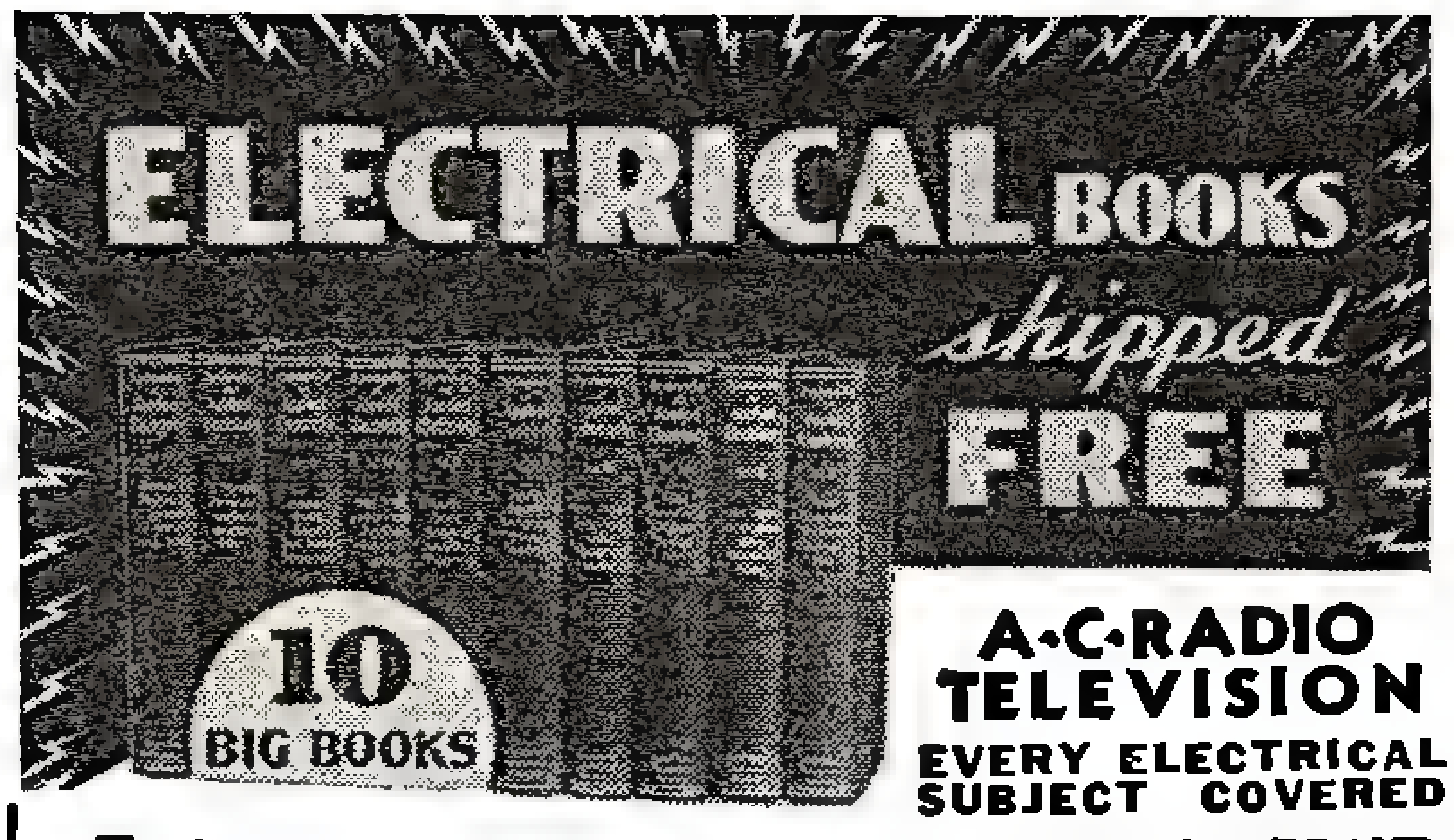
Where water is limited the cradle or rocker is used. It has a capacity of 3 to 6 yards per day if worked by two men and requires not over 100 gallons of water per cubic yard of earth handled. Sticky clay and cemented materials should be soaked before being put through the rocker.

The cradle or rocker is a trough or box mounted on rockers set crosswise beneath the box, and combines some of the washing motions of panning with sluicing. It is a sort of selective, slow-motion sluice. Above the rocker box is a screen hopper where first washing and sorting takes place, and between the box and the hopper is the apron, a piece of canvas or carpet in a frame, with enough "sag" in it to form a preliminary pocket designed to catch the heavier mineral particles as the screened materials are washed down from the hopper.

In operation the hopper is filled about half full, water is dipped in or slowly run in, and the screened material falls from apron to box, where it is subjected to riffle action augmented by the rocking motion. Extra long rockers with mats are needed for fine gold. In building this outfit smooth lumber is used and a single board is used to form the bottom. Slope of the rocker from hopper-end to lip varies but usually is around 2" for each 3' of length. Spikes in the rockers or pegs from the base fitting into rocker holes, keep the rocker from slipping "down-hill."

Always keep a check by panning to be cer-

(Continued on page 141)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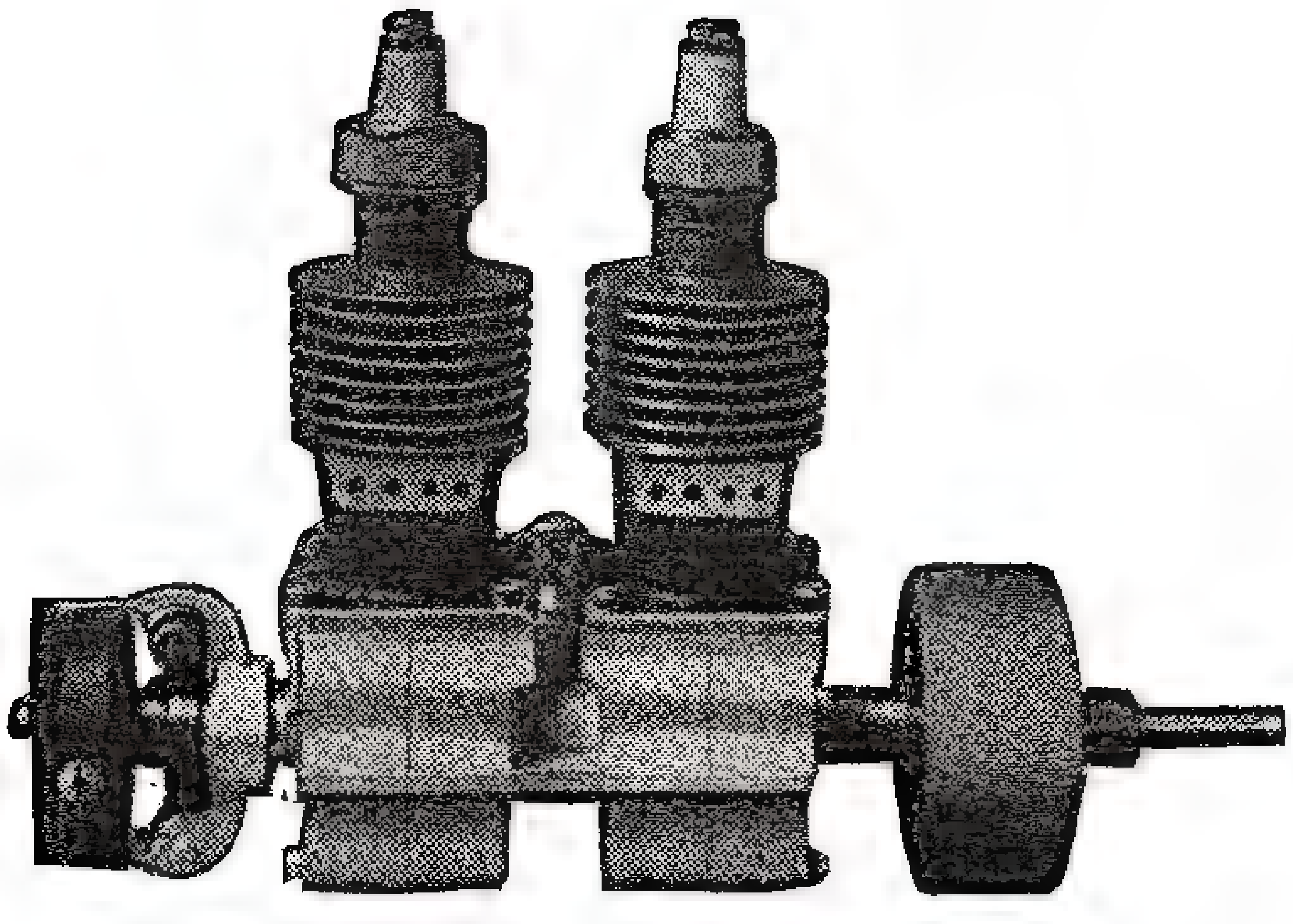

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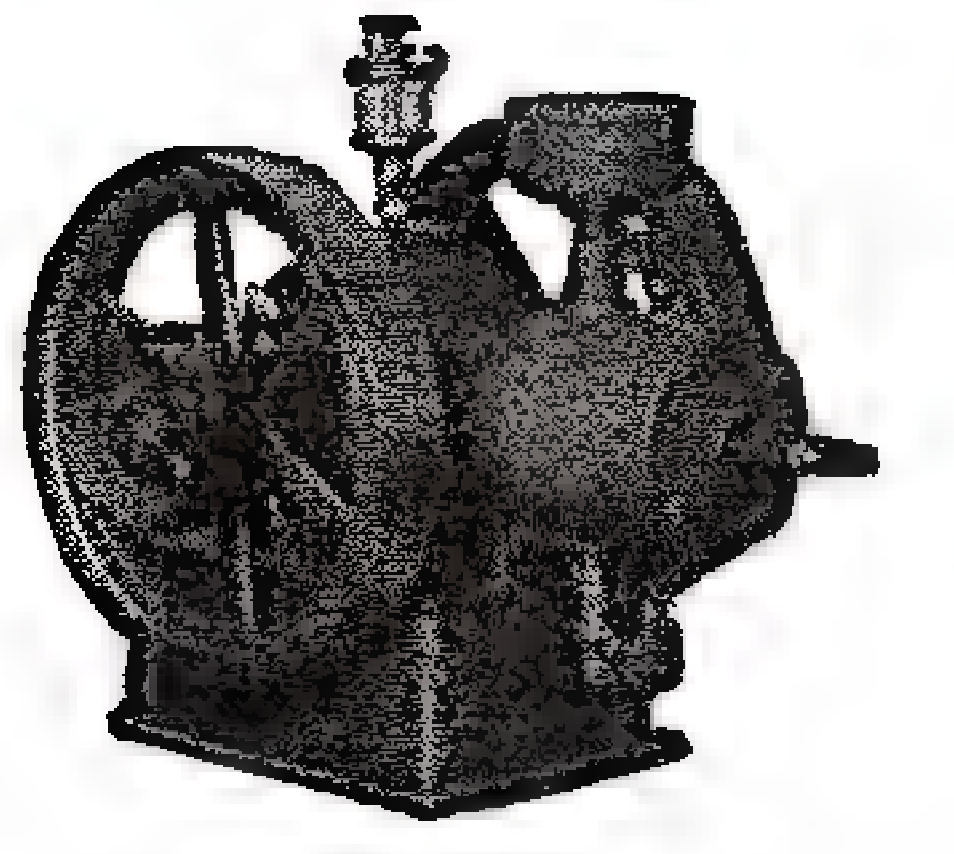

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Explain Accidents With Models

(Continued from page 88)

decides to pass to starboard, and sounds two blasts of his whistle. The other captain thinks this is merely the fog signal, and wants to pass to the opposite side, so he issues one blast. Skipper A, hearing faintly because of the wind, takes it to be two blasts in answer to his own, and then the fog shuts in. Both vessels have "turned out" for each other in the same manner that the fabled drunken Indian turned aside to "let the bridge go by" in his speeding auto. Both unwittingly bear down on each other, crash in the fog, and one sinks.

Clearly someone is at fault, and only in a maritime court could such a case be tried.

Another recent happening on the high seas is the matter of the burning trans-Atlantic liner *Atlantique,* which recently took fire and was abandoned in mid channel in the English Channel.

Laws of the high seas say that any vessel saving another from destruction is entitled to salvage damages. Further, any vessel salvaging an abandoned vessel has full claim on her.

The *Atlantique* was blazing merrily away, her fine new decks a holocaust of smoke and she was drifting at a rapid rate toward the Cardiff cliffs of England.

If she beached there, she would belong to the English, who could salvage about $2,000,000 in steel.

Dutch trawlers hooked on, at the same time that French vessels came to the aid of their sister of the French Merchant Marine. Both Dutch and French towed valiantly in opposite directions. And both, for the moment, according to sea law, were right.

The French finally solved the problem by putting the *Atlantique's* captain back aboard thus making it illegal for the Dutch to claim her, and the captain accepted salvage tows from the French vessels, nailing a French flag to a jackstaff to inform the Dutch trawlers of this.

Smart work, and it required the knowledge of the "rules of the road" on the high seas, where there are no sign posts, and the traffic cop sits at home a thousand miles away, judging cases on the merits involved in desk-top collisions with models as shown in the diagrams and photographs.

Talk With Continent on Transmitter

(Continued from page 125)

slight shifting will alter the frequency relation of the turns.

The tank tuning condenser can be any suitable receiving variable condenser of approximately .00025 capacity, with a pig-tailed rotor if possible.

The diagrams show clearly the construction of the tank and antenna coils. The tank coil should consist of five full turns of ¼ inch copper tubing wound about 2½ inches in diameter, spacing the turns ¼ to 5/16 inch apart. Bend each end out in a line and to their ends solder a large soldering lug as shown. With a tape, measure the exact length of the tubing and strike a point midway for the center-tap, soldering a wire at that point.

Unlike the usual method, the antenna coupling

Talk With Continent on Transmitter

coil is inserted inside the tank coil, coaxilly with it. Wind this coil of any heavy copper wire, No. 10 or No. 12, and 1-inch in diameter. Seven turns is about right but not necessarily an exact number. Make the coil slightly longer than the tank coil and bend the ends in a right angle relation to it and solder lugs to these also.

Both coils are to be mounted on small Bee-hive insulators that stand above the base about 1½ inches. In lieu of these small wooden supports can be used or even spark-plug porcelains can be made to do the trick.

All wiring is done under the base using any suitable insulated wire of 18-gauge or larger. All connections should be well soldered and taped to prevent short circuits. The tank and grid coil center taps connect directly to Fahnestock clips bolted to the base as shown. These are then wired into the circuit.

Follow the wiring diagrams (Figs. 2 and 5) closely and you can't go wrong. Where "ground" is shown it is the same as B minus.

In the matter of the grid coil; eight turns to a side may or may not be proper for the midget you are to use. If the radiation cannot be altered by operating this condenser, then take off or add one turn at a time to each winding until the condenser has its effect.

This can be noted by watching the milliammeter. With the feeders disconnected, resonance of the grid with the plate can be determined by a dropping of the ammeter needle.

In the matter of sockets once more. A five prong socket is marked H-H-P-G and K. For the use of pentodes with no cathode such as the 247 and 233 the G terminal is the control grid (connected to the grid-leak) and K terminal is used for the screen. P is plate as usual. In the case of six prong sockets the tube cathode is connected to the K terminal of socket as intended and the two grids have separate terminals marked for them.

Always shunt the milliammeter out when keying otherwise the meter needle may be strained out of position. If you have no milliammeter you can use a flashlight bulb in its place to indicate resonance. Shunt out the light when keying or the note will show a chirp making it difficult to copy at the receiving end.

For power a single power pack or the required voltage can be used or two separate ones for plate and screen voltages. In the latter case say a 300 to 500-volt pack is used for plate supply and a 135-volt B eliminator is used for the screen voltage. In this case connect the B minus of each one to the B minus clip and their high power terminals to their respective clips on the transmitter.

Filaments for the 247s, etc., should be from a suitable filament transformer but for the 233s the filaments can be lighted direct from a 2-volt battery.

Any suitable antenna system can be used with this transmitter. Simply connect the feeders to the two clips on the antenna coil after the transmitter has been tuned to resonance and then tune the feeder system to it. This may throw the set slightly out of resonance after which it should be carefully retuned. Like any transmitter; this one must be licensed by the Federal Radio Commission and you must have a license to operate it.

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Building Cabinette Cruise Trailer

(Continued from page 101)

erratic and hard on tires. Instead of turning the corner the trailer will be dragged around it, and the whole thing is unscientific.

The way to get the right trailer tongue is to take your car to some airfield, or other wide place where there is dust enough to see the tracks. Cramp the wheels and run the car in as tight a circle as it will go.

This will make tracks as shown in the drawing, Fig. 9. Now bring on the trailer. Run it right in the tracks of the car on the same curve. When it approaches the car to the point where the tongue, either real or projected in an imaginary line, hits the towing bar, there is your tongue length. Anything different will result in difficult, wasteful towing. Fig. 10 shows a shock-absorbing tow hook-up to be placed on the car itself.

Body

Now the body can be put on the trailer, with the underslinging and the towing arm made ready. White oak stringers, 2"x4" are used to mount the body on. These are bored and countersunk for ½" carriage bolts which go right through the frame. See Fig. 11. The last one toward the rear must be a U bolt going around the stringer, as there is too much weight hung cantilever at that point to risk cutting the stringer through for a fastening.

On these stringers are bolted, with quarter-inch carriage bolts, the floors, of 2x2 white oak. On these floors is laid ¾" t & g fir flooring. In laying out, allow 9 inches wheel box space, and shorten the flooring and the floor beams at this point accordingly.

With the floor built upon the trailer, the side framing and end framing are put up. See Figs. 15 and 16. The framing for such a body is simplicity itself, and the drawings specify all the required sizes of 1"x2" white oak stanchions, into which are mortised window clamps and roof beam clamps. See Figs. 14 and 15. These clamps are all fastened with two quarter-inch carriage bolts at each mortise, and are tied with cool rolled 16-gauge angle plates at the ends.

Always use bolts in this type of construction, and rivets where specified. Use no screws. They work loose.

The roof beams are steam bent, and it is suggested that you let your local blacksmith attend to this matter if you cannot handle the work as he is apt to have a steam box for bending felloes. Otherwise they can be cut to the crown of 6" in 6 ft. on a bandsaw, though this entails slight waste.

The roofing is of ordinary ½"x4" beaded cedar ceiling. This as in box car practice is nailed on with galvanized shingle nails. Canvas laid in paint and turned down with proper half round molding at the edges is used.

The sides are ceiled with the same material. Or if you want to be real fancy, you can lay chicken wire over the frame work, pad it a little and use Fabrikoid as a covering, though this is expensive.

The windows are spaced as shown, and a detail shows how both frames are cut for accommodating screen or window panes at once. Right hand drawing, Fig. 15.

The door in the rear end is sliding, made of a panel of 3/4" fir with plywood panelling. It slides instead of swinging, as swinging doors jamb, and take a lot of room. Don't use the 1⅛" door shown on the drawings.

Equipment

The putting on of the ceiling will complete the body, and the trailer is now to be painted and furnished.

The matter of beds is one which was given a lot of study, and it was decided that the best thing would be to use the type of bed known as Studio Couch, which can be had at any furniture store for less than 20 dollars completely equipped.

These are best disposed as the layout shows in the arrangement plan. Up in the right hand forward corner, a small closet is made to accommodate a water closet of the light, cheap kind, and also a folding wash basin with drain to a water boiler which is slung below the chassis. (Not shown.) This boiler can be equipped with a valve so that after breaking camp one can drive to some side road for a minute, and open the valve, disposing of the sewage off to one side of the road. This will be found efficacious and unobjectionable and well worth the trouble.

A water storage tank, in the form of a hot water boiler cut in half is hung above the sink, and piped to the water closet, to the wash basin and to the sink. An outlet tap and a hose are carried, and at any filling station the hose can be connected, the tank filled, and you can be on your way.

The matter of clothes storage is important, and if disposed as shown you will have room for guns, hunting equipment, or traps as well as for your store clothes and Sunday Go to Meetin'.

The pantry doesn't have to be large in a thing like this. Only the staples are needed, and you'll find you'll be buying nearly as many meals as you get yourself.

An Albert Lea two-burner stove of the four dollar kind is more than adequate to heat and cook with and a pail and a mop and a broom complete the job. You are ready to move in, hook up and be off to the lake, or the mountain, and have no hotel bills!

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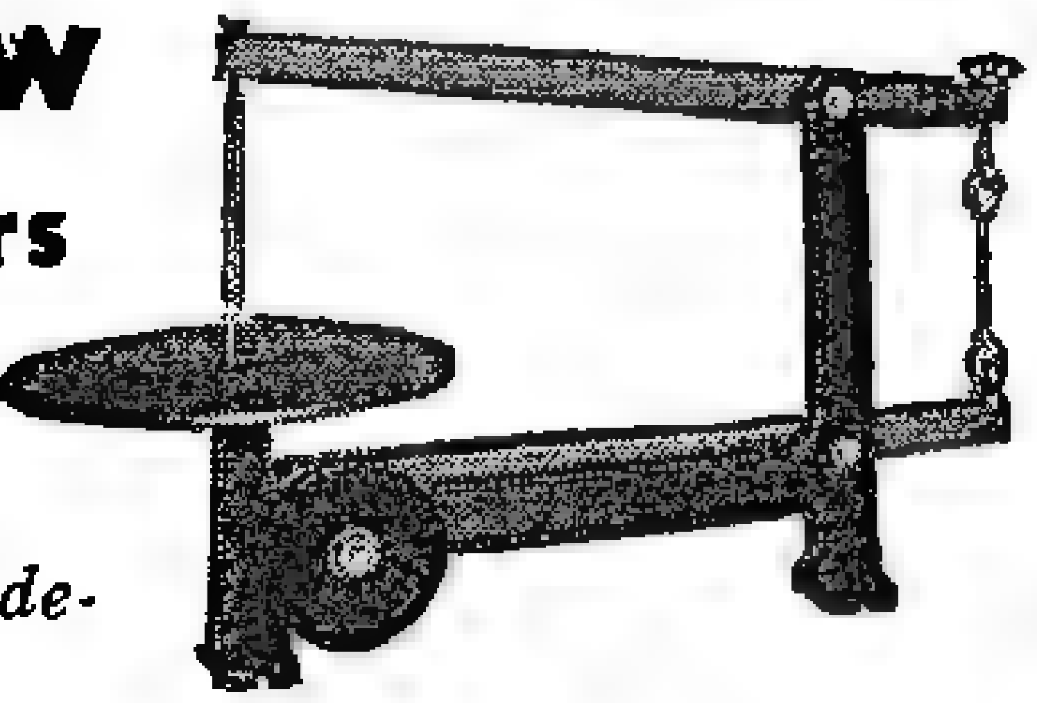

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Plans for "Scram"

(Continued from page 119).

the bottom (two thicknesses of ⅜" stuff).

The piece next the chine is cut to shape. It can be held to the boat for fitting by Clamps padded so that the wood will not be marred. Flat head brass screws, ¾" No. 7's are used. They are spaced about an inch apart along the stem, and about three inches along the chine and batten. Holes for guiding the screw, just a trifle smaller than the threads, are drilled for each hole with a small breast drill or a Yankee Mr. Punch. The screws are soaped with laundry soap to avoid twisting the heads off and to make for easier driving.

Each plank is then fitted against the neighbor this way.

Along the chine the screw heads are set just a trifle lower than flush, and at the stem and on the frames. The batten seams are screw fastened from inside, using ¾" No. 6 round head brass screws with two brass washers under. This fastens the batten seams blind at about 3" intervals, and does away with difficult finishing on the outside of the hull.

When the topside planks are all on the job looks like the photo on the bottom of page 118 and the top of page 119.

Bottom Planking

The bottom planking, strips of ⅜" by 4" width spruce, is laid on. Just tack it with copper tacks, and where the frames have some concavity forward, screws can be used. You see, when you put on the outer layer of ⅜" mahogany the screws you use in this outer layer will also fasten the inner layer.

This will be a good month's work in spare time if you are working it that way, and must suffice for this month's discussion. Next month we'll finish the boat and the motor too.

BLUEPRINTS OF "SCRAM"

Although all the details for the construction of Scram will be run in subsequent articles, we are now selling complete sets of blueprints for this wonderful little flyer at $3.00 the set. All dimensions and material details are covered in the plans, which come in one long roll. If you want to get started without waiting for the succeeding issues, get these prints and get going now! Address

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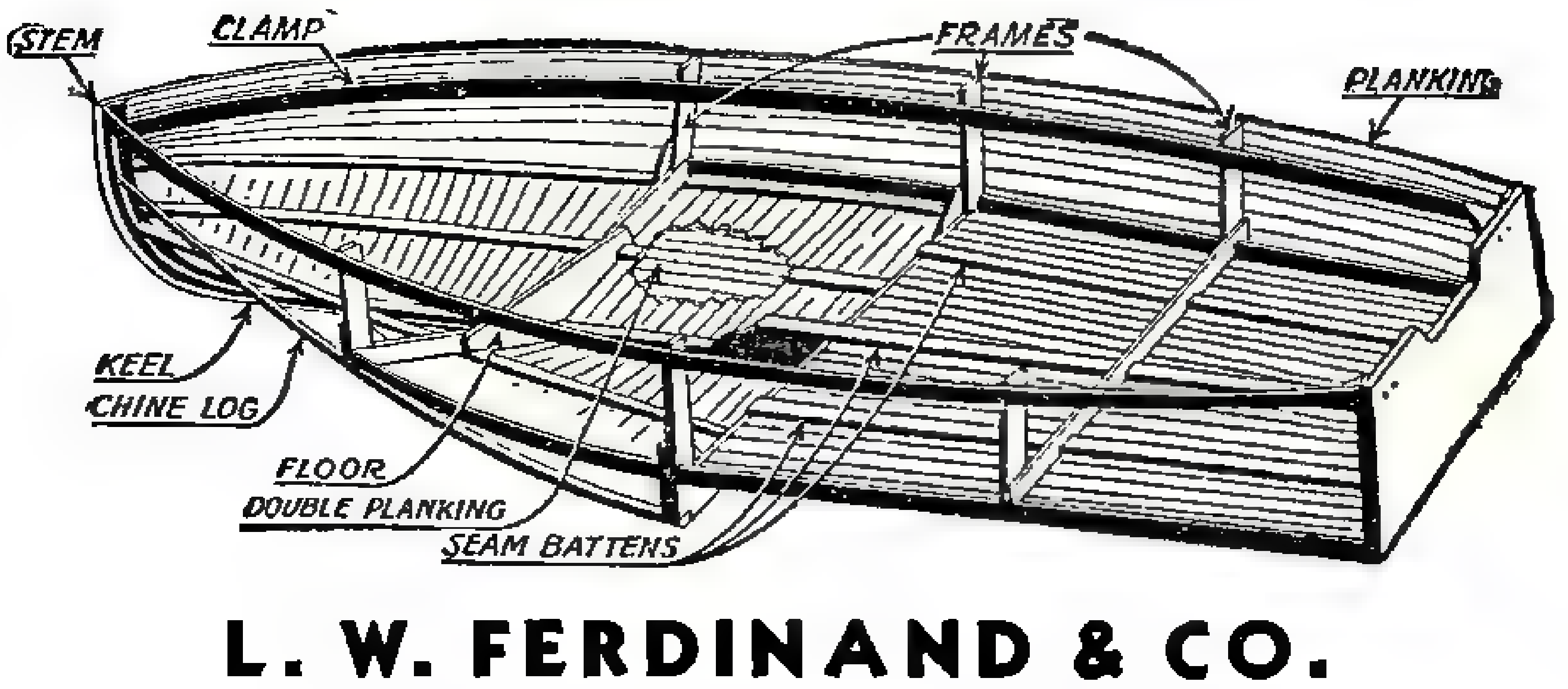

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597 Albany Street, Boston, Mass.

When Gold Is Found, Sluice 'er Out!

(Continued from page 135)

tain you are catching the gold. And as you wash out rough material in the hopper of any of these outfits, keep alert for chunks of quartz containing free gold; that might indicate a lode mine up-creek.

These are simple, low-cost hand-operated, home-made pieces of placer working equipment that increase your efficiency from 6 to 12 times above panning. Your original prospector's outfit will cost less than $5; these machines should not cost more than $15 more. On $1 ground two men can make expenses or better if they are willing to work at sluice, tom or rocker.

One important warning; always be sure you are to true bedrock, for the richest gravel is right atop the rock and pockets or old crevices overlooked by early miners may be the richest spot on your claim.

In our next article we will give information regarding the low-cost, highly efficient, portable, ready-to-go outfits called "placer machines" which will double each man's capacity and efficiency over cradle, sluice or long tom. One such machine has a record of producing about $1,200 per month in rich ground. We are going to give the information regarding these machines because the man who has cleaned up a little "stake" by pan or sluice can take another step ahead in building up to good returns by using some of his capital to increase efficiency of each worker. Also in the next issue we will tell of the "dry washer" used on placers in the desert.

Grow "Blood" for Human Health

(Continued from page 81)

Dr. Schertz's extraction of pure chlorophyll is the result of 12 years of experimentation. He has produced this essence of concentrated sunshine—so closely aligned to the blood itself—on the largest scale ever known. His apparatus consists of an electric drying oven, a "ball mill," a "screening machine," a silver-coated separator of the super-centrifuge type, and a group of large funnels, pyrex tubes, almost twice as tall as a man, and numerous flasks.

"My very first step," explains Dr. Schertz, "is to select a desirable kind of leaf or plant. The kinds of plants most used in my tests, are bluegrass, spinach, cow-peas, or stinging nettles.

"My next step is to have the entire plant structure cut clear down to the ground. Whereupon the stems, leaves and all are placed on a tray in an electric drying oven where they remain for from 12 to 24 hours. Next the dried leaves and stems, along with a supply of stones, are placed in what is known as a 'ball mill,' and ground into a fine powder, which then is separated from the coarser stem material by a 'screening machine.'

"Next comes the extraction process. The leaf powder is soaked in acetone and run through a large funnel where the four pigments are extracted by the simple process of adding more acetone. The final stage is to run the liquid chlorophyll through a silver-plated separator of the centrifuge type, which removes all impurities, and results in a solid mass of almost pure chlorophyll in the bowl of the centrifuge."

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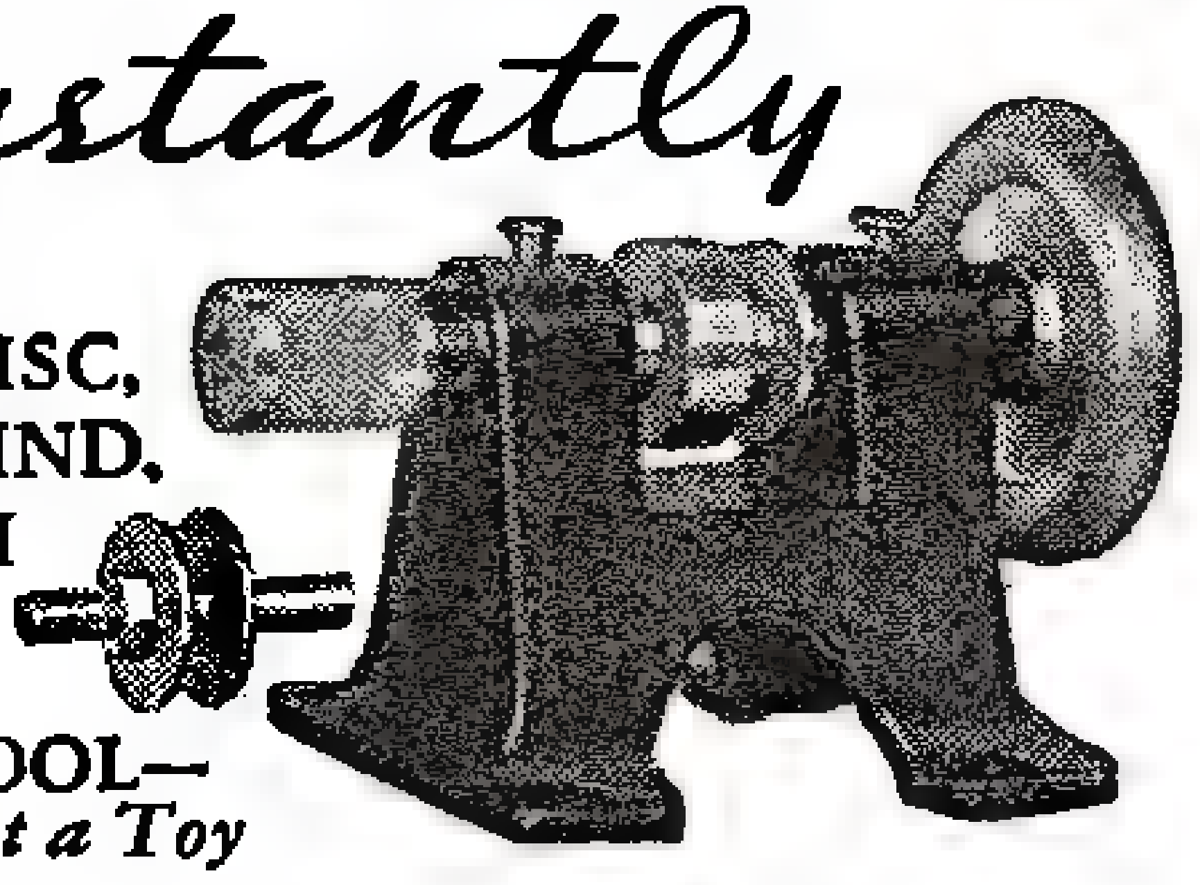

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Thousands of men past 40 have lost their health and strength—and don't know the cause. They suffer frequent night rising, chronic constipation, backache, foot and leg pains, sciatica, nervousness, mental depression, etc. Many think it is approaching old age. Others wrongly attribute their trouble to bladder and kidney. This is sometimes a dangerous mistake. Science has discovered the real trouble is often prostate gland failure—a grave affliction. But an amazing new drugless home gland treatment has been perfected that thousands of users say has brought swift relief, and quickly restored normal activity.

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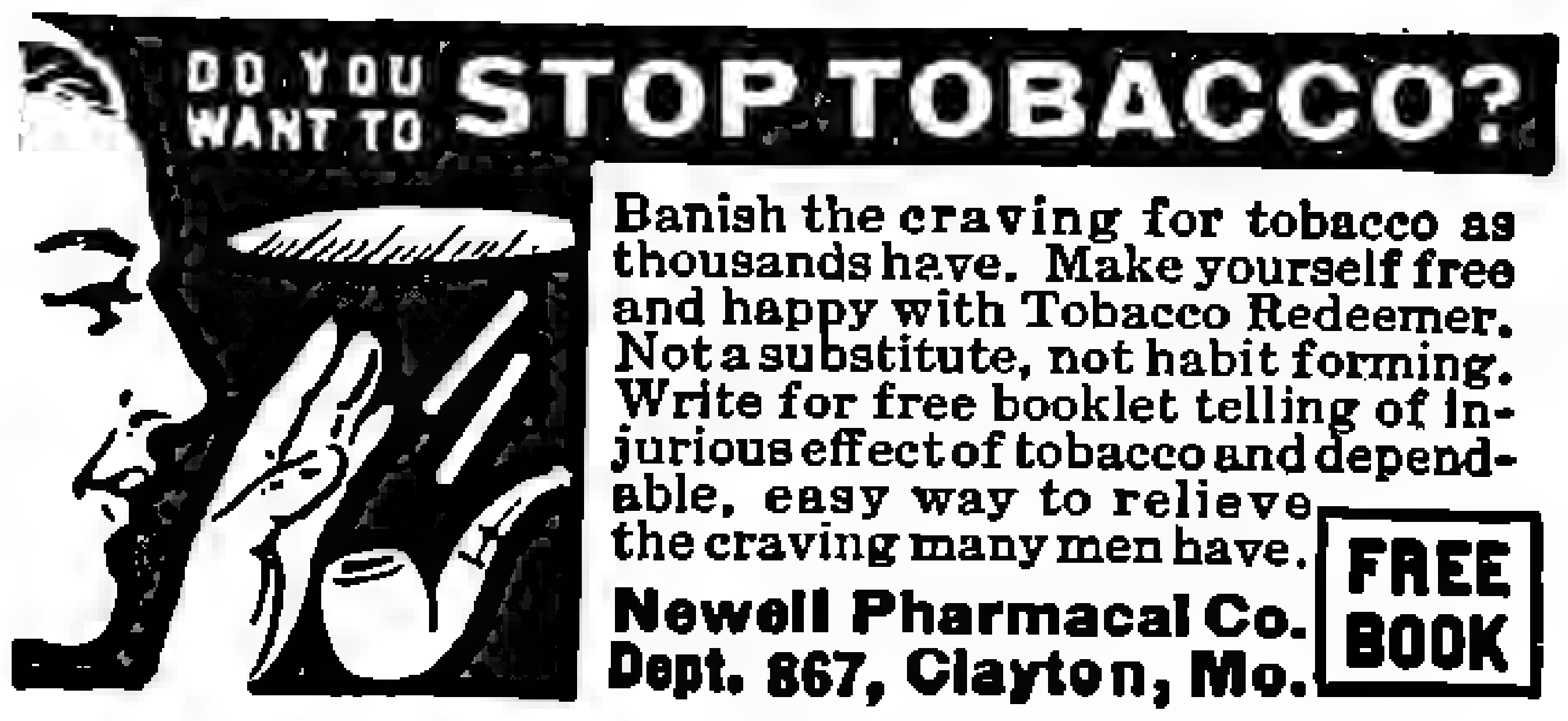

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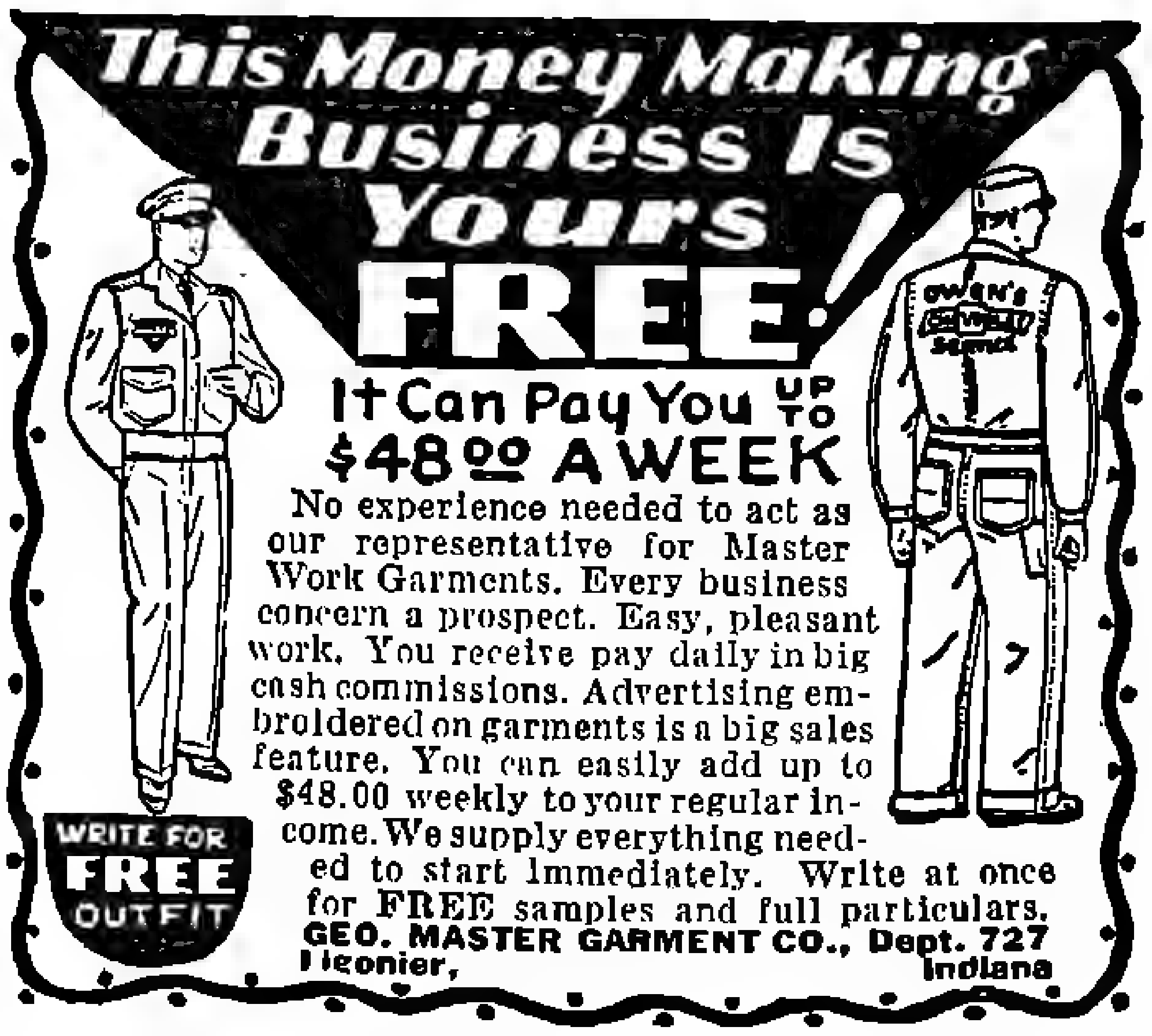

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A Water Wheel for Farm Stream

(Continued from page 108)

The weight of water in the buckets keeps one side of the wheel constantly heavier and, of course, accounts for its turning power. The bucket placings are scientifically designed for quick loading and easy spilling, and please do not try to make them square "so they will hold more water" because they will not empty quickly, and so in carrying up on the other side the unemptied water you will lose what you theoretically gain by the opposite side's increased loading. This is simple language, and pertinent, for I have had this question brought up to me about another little water wheel which was run in this good sheet's brother mag, Mechanical Package Magazine, some time ago.

If you have access to quite a head of water, part of which can be piped, I would suggest you write us concerning your needs. If half a dozen or so write in to Sam Wing, we'll run another little more complicated article on a vane type enclosed turbine that can be operated in a closed pipe line. Address me care Sam Wing, 529 So. 7th St., Minneapolis, Minn.

"Vibrometer" Makes Music Visible

(Continued from page 102)

placed on the rubber diaphragm, it will be necessary to create just the slightest depression in the center. This is done by hanging a small weight from the center.

The cabinet proper is made of plywood with a three-quarter inch soft pine base. The window in the front is cut out on a band or jig saw and provided with ground glass. The images of the sound waves are created by the light reflected by a series of mirrors, the mercury itself acting in the capacity of a mirror. These mirrors have tin backs of the size and shape illustrated and are attached to the posts with angles.

The source of light may come from a small magic lantern or the experimenter may easily build himself a small light projector. The more powerful the source of light the better.

It will be necessary to do a little adjusting to make this device perform perfectly. In arranging the mirror at the correct angle, it should always be borne in mind that the angle of incidence is always equal to the angle of reflection. In the use of this instrument, the builder will find that matters will be helped a bit if the inside of the cabinet is painted with dull, black paint.

Midget Sweeper Cleans Dining Table

(Continued from page 127)

and drill a hole through the sides of the box and lengthwise through one of the cross pieces to which the motor board was screwed. This hole is of a size to receive a steel or brass rod which forms a locking device.

On the bottom of the box mount three or four furniture slides to raise the sweeper far enough from the table or floor to permit dirt to reach the slit.

In operation, crumbs or other material enter the slit, travel to the center of the fan and are thrown out to the edges by the curved blades, landing eventually in the compartment at the rear, from which they are emptied at intervals.

Fighting Chinese Pirates

(Continued from page 72)

and then negotiate a still further distance up the latter river for ninety miles, which is within ninety miles of the capital city of the province of Szechwan, Chengtu. This province alone has a population estimated at three quarters of that of the United States.

To better understand the reference to the Volga boatmen one has but to visualize the life of the "junkmen" in a round trip through the gorges and the part played by human labor. The voyage downstream from Chungking to Ichang, while extremely dangerous, is comparatively a time of rest for the crew. It is only a matter of skill to so handle the huge bow steering oar, assisted by the regulation rudder, as to keep the junk in the proper part of the channel. If all goes well the current does the rest.

It was not until 1901 that steamer transportation was made possible through the treacherous gorges, thus infuriating the junkmen who saw their sole means of livelihood diminishing. Up to this time the dangerous rapids, whirlpools and currents made navigation possible only by junks. When it is considered that three round trips between Chungking and Ichang was the entire life of the average junk, and the long time it took to make the upstream journey, it is realized why the freight rates were extremely high.

The hatred of the junkmen for the steamer companies thus engendered is mainly responsible for the reign of piracy in the Yangtze region, and no opportunity is lost by the junkmen to bedevil the companies, set fire to the steamers, intimidate the pilots, boycott the exporters, kidnap the passengers and finally, for the renegade snipers stationed on the banks, to pick off the pilot, thereby wrecking the ship.

Again and again the Yankee tars, comprising the crews of the seven gunboats which patrol the Yangtze for Uncle Sam, are called upon to engage in hand-to-hand combat with the ferocious river pirates. A striking instance of this sort took place some months ago when the gunboat **Palos**, assisted by the British gunboat, **Aphis** and the Yankee gunboat, **Guam**, was responsible for saving an entire town, with industries and property valued at over $2,000,000, from what otherwise would have been certain destruction.

The trouble started early one month when the **Guam**, cruising past Yochow, some 130 miles above Hankow, along the Yangtze at the junction of the Yangtze and Siang Rivers, was suddenly fired upon by bandits from the shore.

Later that same month the bandits, thought to be communists, captured the city of Changsha. It so happened that the **Palos** was cruising nearby, besides the British gunboat, **Aphis**, and the Italian gunboat, **Eermanno Carlotto.**

These vessels evacuated all the foreigners living in the town and then the **Palos** moved down the river just below the town to get out of firing range. A couple of days later, the **Palos**, on an inspection tour, cruised past the town. Then the fun began. An indeterminable number of pirates opened fire on them, finally being put to utter rout, fleeing, no doubt, deep into the hinterland. At any rate, the prompt action and vigilance of the **Palos** saved the city.

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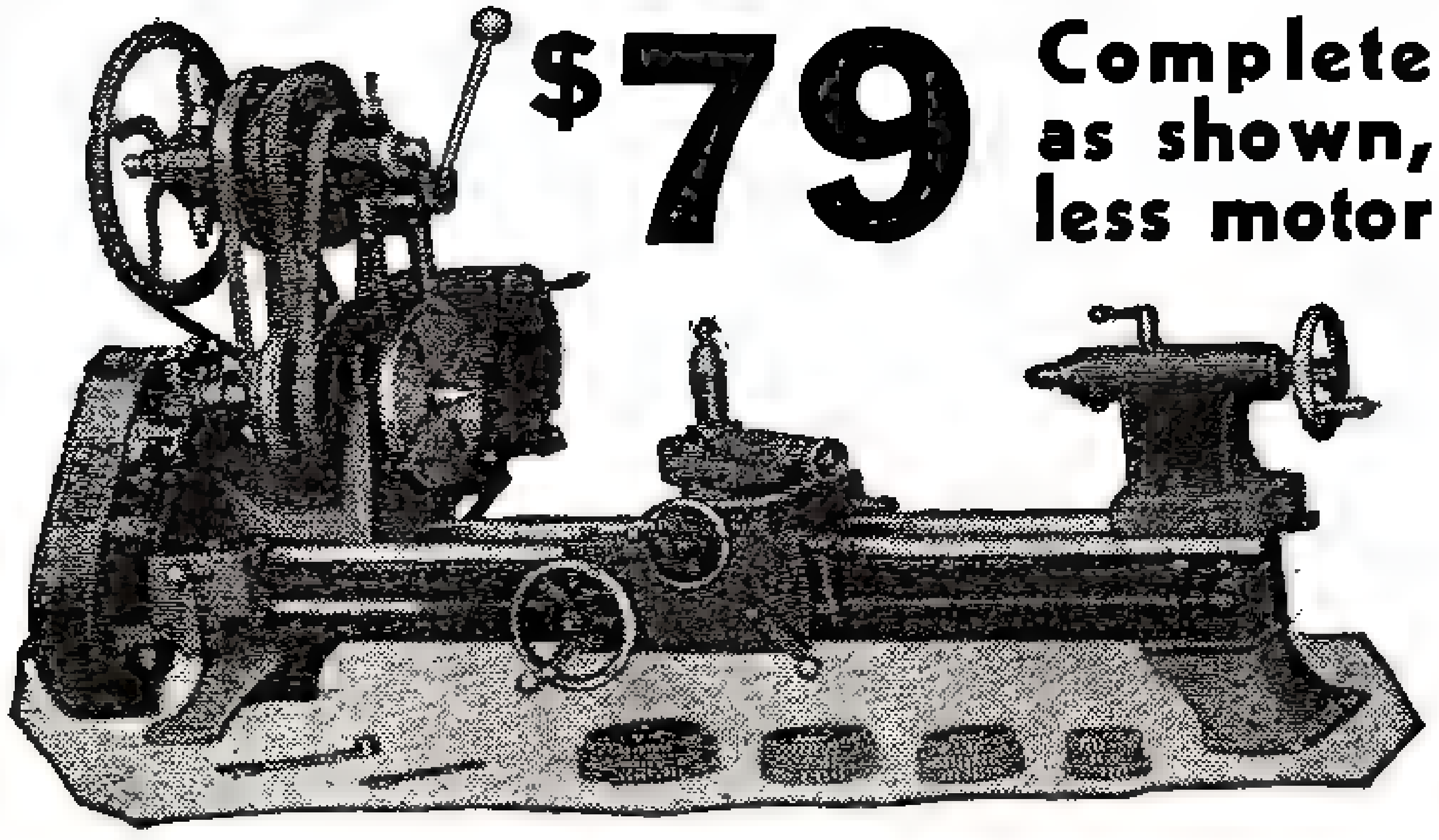

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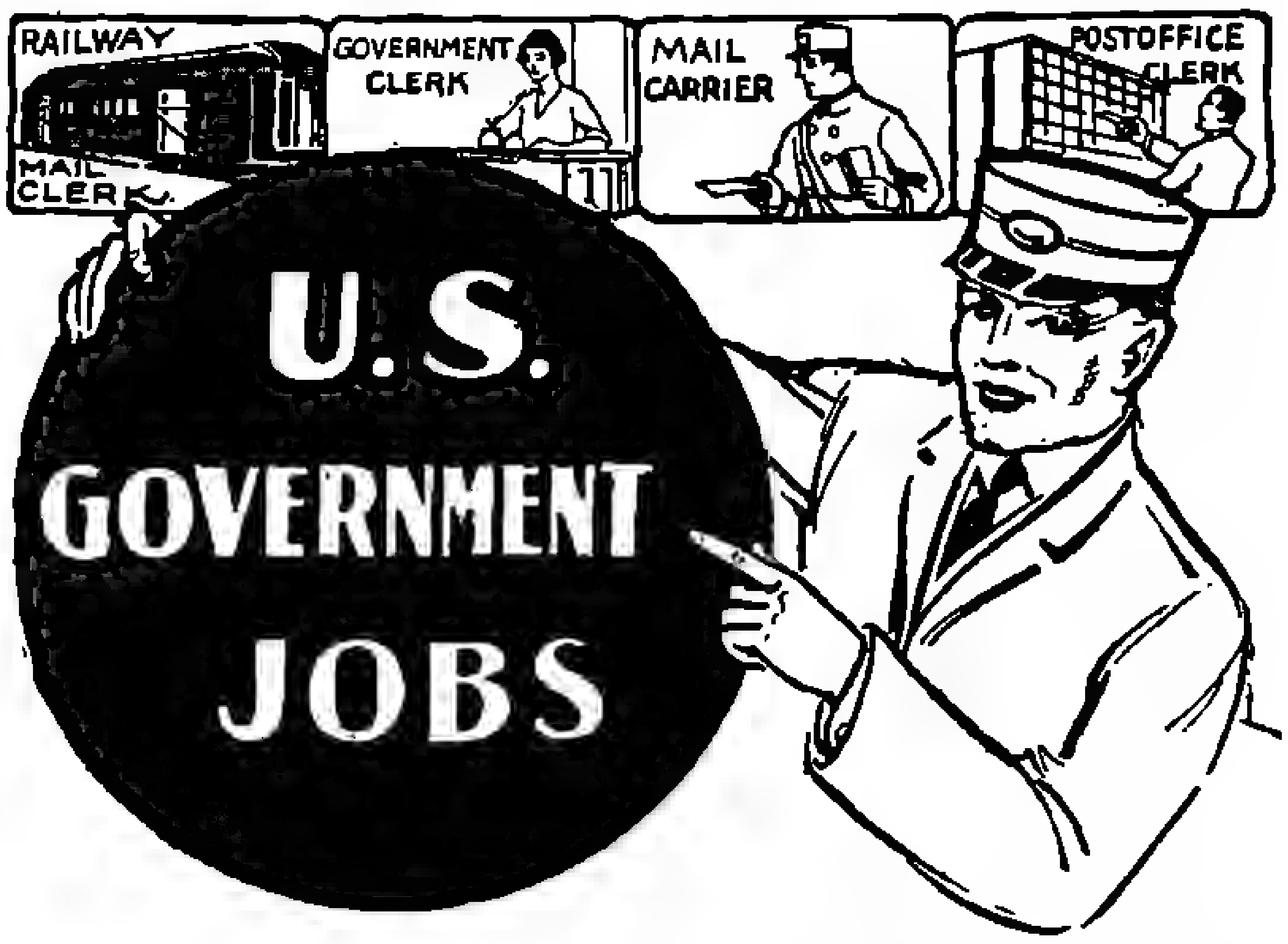

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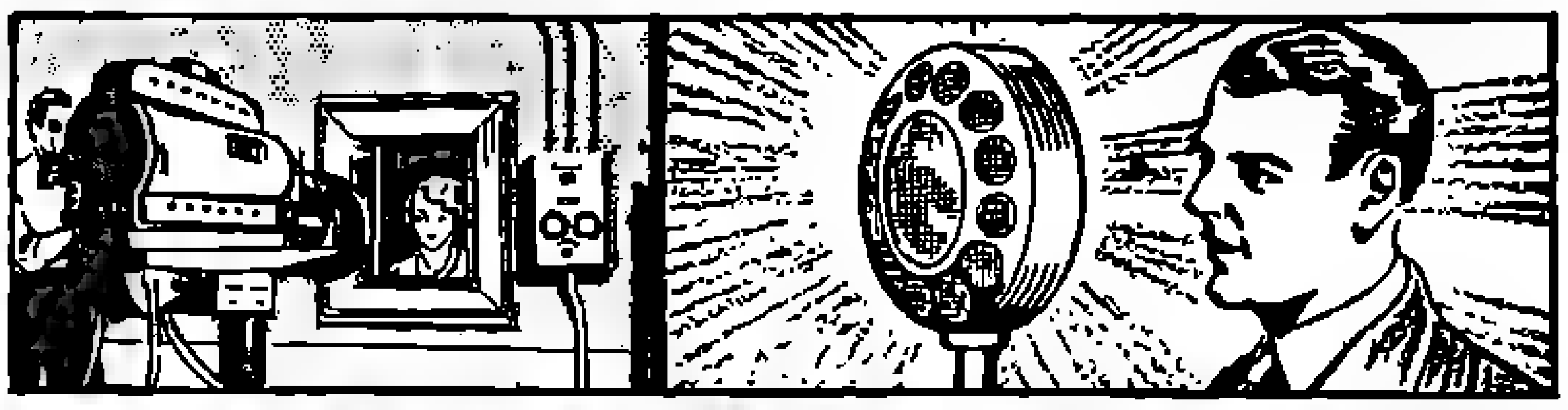

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Fortune Making Ideas for Inventors

(Continued from page 120)

A Device to Protect Plate Glass Windows

During a recent visit to the city of Buffalo, N. Y., during a 70-mile-an-hour gale coming off the tip of old Lake Erie, I counted seven large plate glass windows on the main street that had been blown in. Here in one little spot on a single day—indeed in the space of one hour's time—there was at least two thousand dollars damage.

Why cannot some clever inventor think up a folding device of some kind that can be placed near a window and that can be used to press against its center during spells of high pressure from the outside? I cannot get over the notion that here would be an easy problem to solve and a real money-maker at the same time.

Specifications: Should take the form of a folding steel brace of some kind that could be pressed against the window at the point of greatest stress during high pressure winds. Should not cost over twenty-five dollars.

Exploitation: An inventor of such a device would do well to first take the invention up with some large insurance company for its indorsement which would be worth a great deal of money. If such a company would agree to lower its insurance rates where such things were used, the rest would be easy. This invention should be worth $25,000 on an outright sale.

A Camera Plate Holder

No matter how careful even a trained photographer may be, he often makes the mistake of taking two pictures on the same film or plate. What is needed is a plate holder that, once the slide has been removed and the picture recorded, will be impossible to use again until the plate has been taken from it and developed.

For instance, the photographer places his plate in the camera, removes the slide and takes his picture. After that it should be possible to replace the slide in the plate holder ONLY in a certain way and after that it will be impossible to remove the plate holder slide by merely pulling on it.

The photographer will know that the plate has been exposed before by the fact that it cannot be removed in the ordinary way.

Specifications: Should not add a cent to the cost of making such articles. Should not be large or cumbersome.

Exploitation: This idea is NOT worth a million dollars but it should be worth a nice little check for about $5,000.00.

A New Mechanical Toy

We all know how tremendously popular the idea of the meccano toy has been both in this country and in Europe. The toy could be many times more popular than it is, however, by obviating the necessity of using nuts and bolts to hold the various members together.

Boys become impatient finally by the mere boredom and monotony. What is needed is a meccano toy that will snap together so that a boy may make things faster. The pieces should be stamped in such a manner that they can be snapped together at any point without the use of any auxiliary equipment such as nuts, bolts or wire springs.

Fortune Making Ideas for Inventors

Specifications: There is no need of saying that this method should produce a cheaper toy because if the problem is solved correctly, the snap feature being an inherent part of each member, the cheapness will solve itself.

Exploitation: Should be patented in this country and Europe and sold outright for $50,000.

Paper Slippers for Shoe Shops

It is an embarrassment of shoes-repaired-while-you-wait-shops that the person doing the waiting must sit barefooted while his or her shoes are being worked upon. Now where is the inventor of a simple paper or composition sanitary slipper that may be passed out to customers, that will be worn once and then discarded?

Wearing such slippers, the customer would at least feel more comfortable and proper sitting with his feet encased even in such a makeshift.

Specifications: The slippers should be made for two cents and they may even carry advertising on their toes. They should be wrapped in a small package and so fixed that they could not be used twice.

Exploitation: Should be sold on a strict royalty basis due to the fact that many millions of pairs would be used annually. The great volume spells royalty.

Glue Balls, a New Idea

It has been a long time since I have mentioned an idea that might be of some interest to my chemically inclined friends. A chemist recently told me of an idea that he had had in mind for many years but never got around to putting it in definite form. He wanted to put glue up in the form of little balls or cakes that could be sold in the chain stores without bottle or container of any kind, which costs more than the glue.

Specifications: This glue, although it does not come in a container, must be protected in some way so that it will not be affected by high humidity. When brought in actual contact with water, however, it should dissolve quickly.

Exploitation: Should be sold outright for $50,000. It should be patented in the leading countries of the world.

Freaks and Dramas of Ocean Bottom

(Continued from page 63)

The most notable of the group bears on its head a sucking disk which is a modified backfin, looking much like the corrugated rubber heels of shoes. This fish is frequently found clinging to sharks to which it affixes itself in order to obtain a free ride to the spot where a kill is made. Upon arriving it detaches itself from its host and feeds upon the fragments.

The suction of the disk is so powerful that the natives of Chinese waters use the fish for catching turtles. They attach a thin line to its tail, and cast it into the water near a turtle toward which it promptly darts and fastens itself quickly to the under surface. If the turtle is not too heavy and powerful it can thereupon be drawn into the boat.

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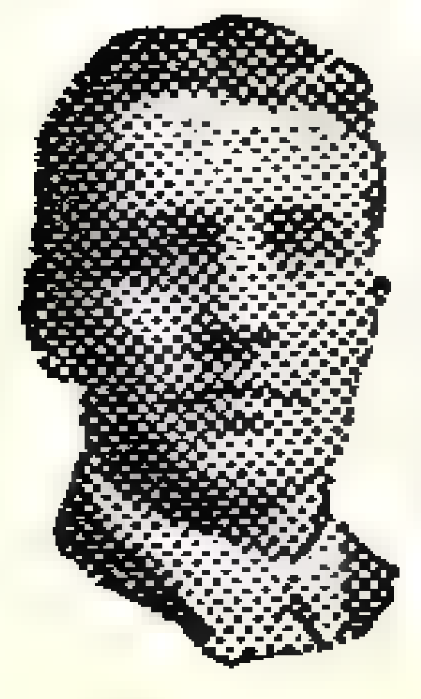

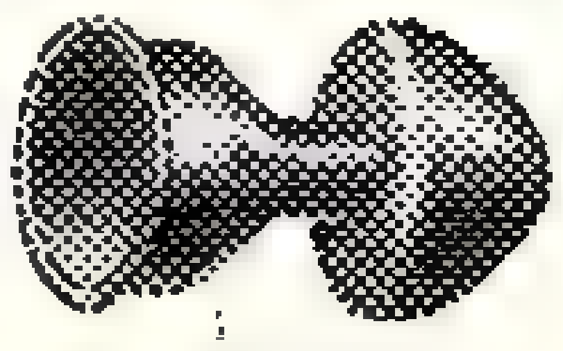

Artificial Ear Drum

Thousand Ways to Make a Living

(Continued from page 79)

one cent each. Twigs of alder, bittersweet berries, laurel and hemlock boughs tied in bunches also found a ready market. Sphagnum moss, the kind which is used in stuffing pillows and making wreaths, grows in swampy places around ponds. Raked out, dried and baled, or even thrown in the back of the car and sold damp, it finds a ready market with greenhouses because of its ability to hold moisture for long periods, making it useful in shipping shrubs. A bale 24 by 30 inches brings from $2 to $3.

Depression Magazine Subscriptions

A Minnesota farmer suffering from the depression took the agency for a group of popular magazines. Approaching his neighbors and friends over a wide area, he offered subscriptions at the regular price of $1. They hooted at the idea till he showed them a chicken crate on the back of his car. "Pay me in chickens," he suggested. In the first sixteen calls, he made fifteen sales and cashed in his chickens at the nearby market well over the amount necessary to cover the subscriptions.

Suit "Club"

When his radio repair business turned dull, a Kentucky man secured the agency for a reputable line of men's suits selling for around $16. He then started a suit "club" among some thirty of his friends and acquaintances. Each member of the club pays him $2 a week for nine weeks. Each Saturday night one name is drawn from a box containing the names of all the members. This man gets a new suit for whatever sum he has invested up to that time—$2 the first week, $4 the second, and so on for the duration of nine weeks. At the end of this time everyone who has paid up his dues in full receives a suit. When a member wins a suit on a draw, he does not continue to pay and his name is eliminated from the remaining list of members. The organizer of this scheme made well over $100 with a club of just thirty members in nine weeks' time.

Mending "Club"

One housewife whose husband's salary had been cut till it covered only the bare necessities, discovered a way of making a few extra dollars each week by opening a mending shop in her own home. Young men who were boarding or living in hotels brought their socks to be mended and their ties to be pressed. And several young married women who held office jobs sent not only their husband's socks, but their own dresses to be repaired, and silk blouses and scarfs that were too fragile to be trusted to a laundry.

Wood for Beach Parties

Boys will like this one. A Wisconsin lad, needing spending money, looked around for ways of earning it. While swimming at a popular beach, he observed that many beach parties came prepared to toast marshmallows and roast wieners, only to have to scurry about for some time to find wood for their fires, since the immediate neighborhood was barren. He gathered up a few loads of wood, tied in bundles large enough for a campfire, which found ready sale among those who used the beach.

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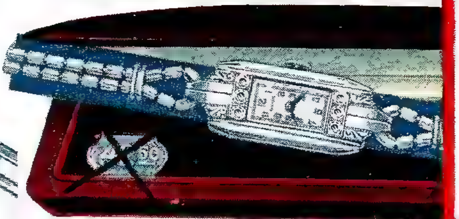

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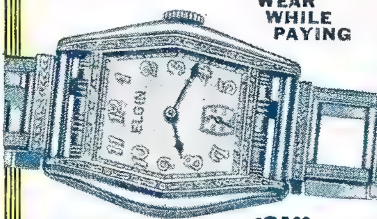

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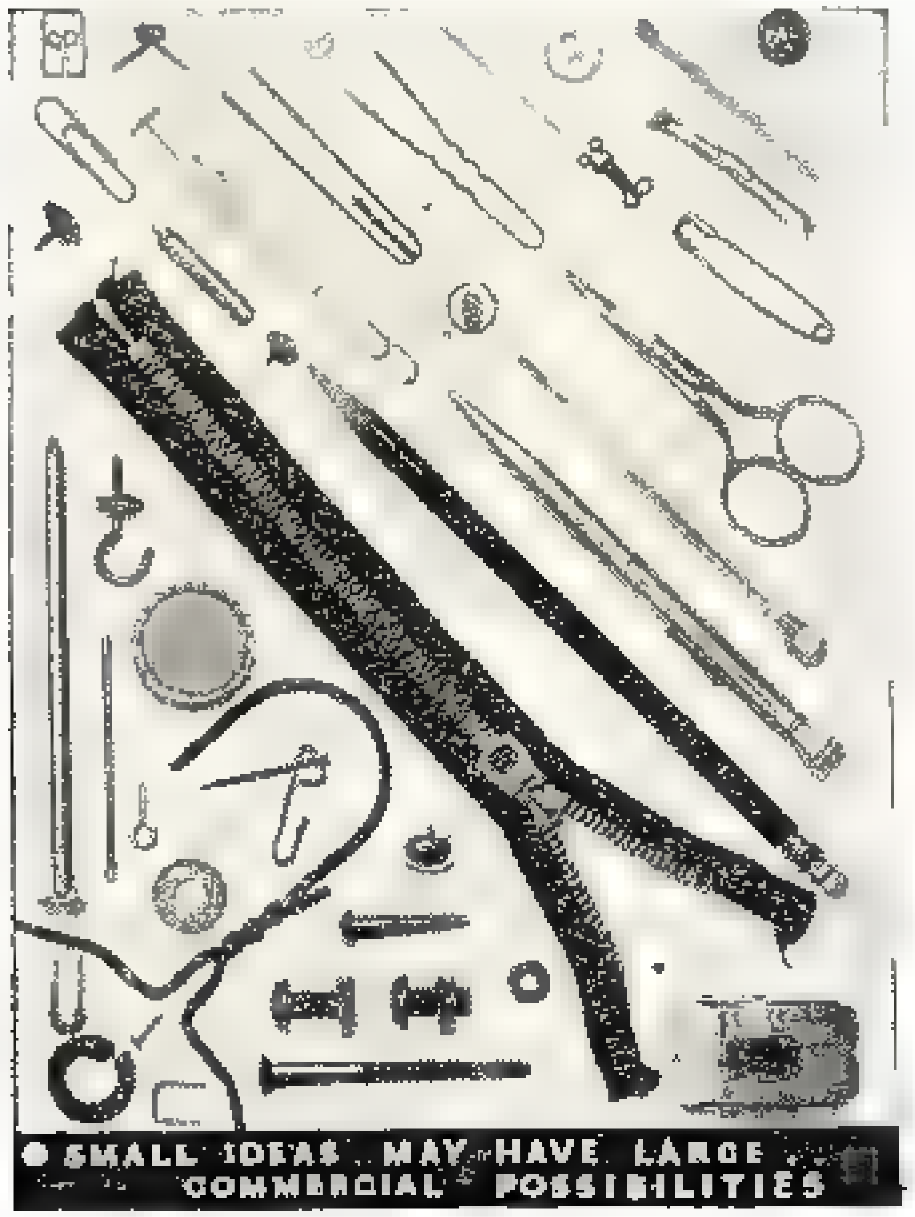

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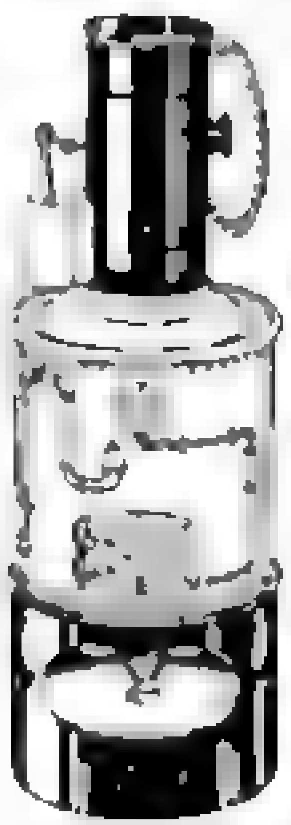

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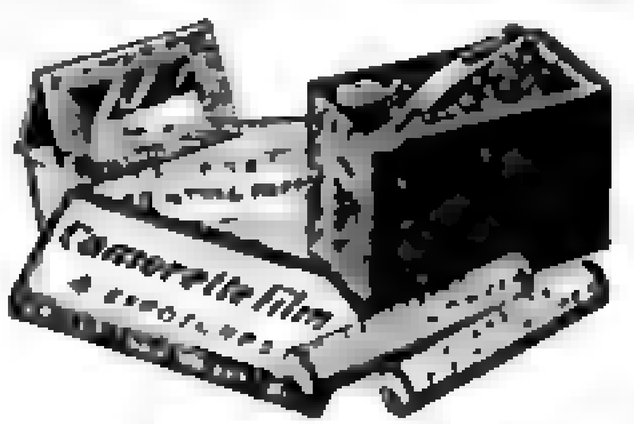

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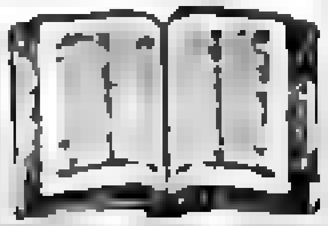

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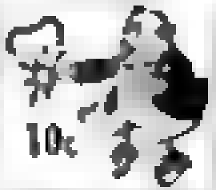

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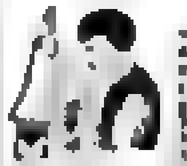

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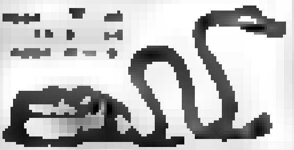

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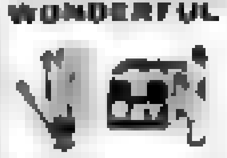

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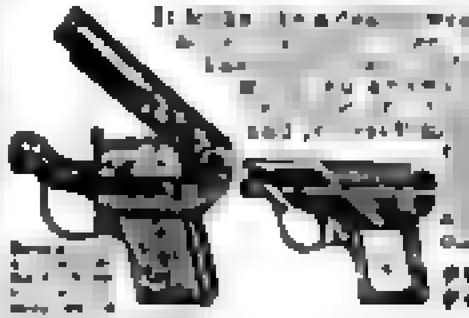

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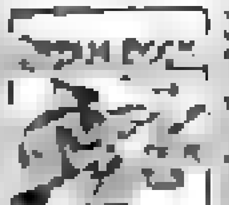

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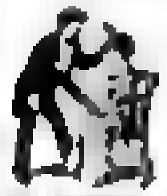

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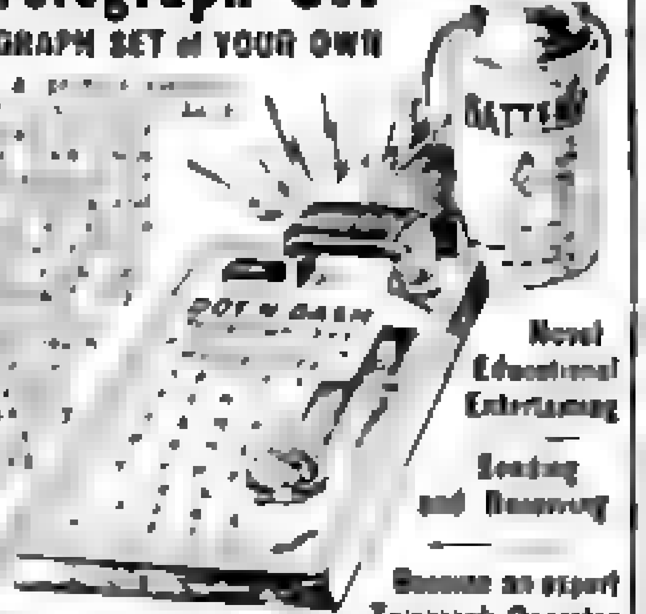

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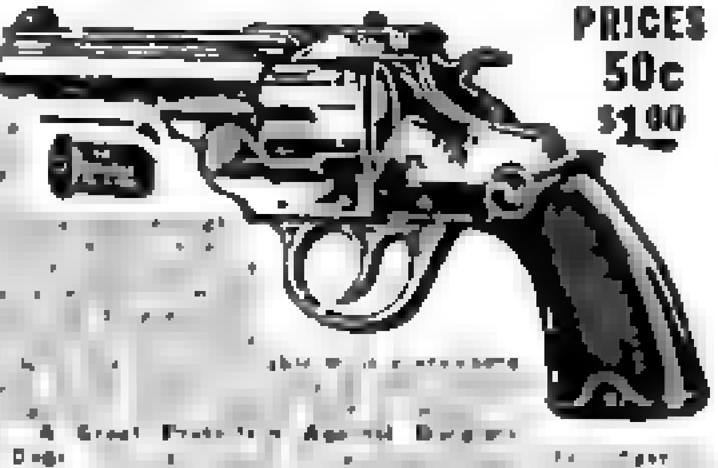

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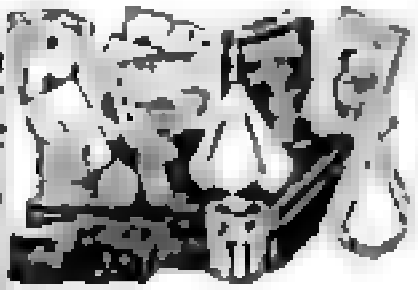

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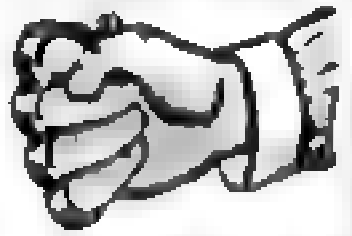

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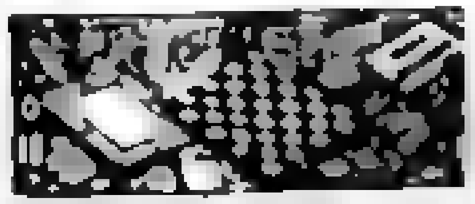

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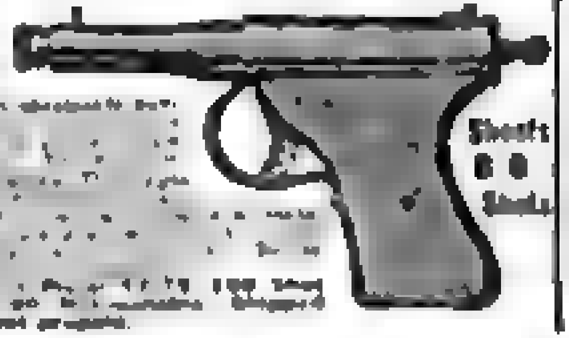

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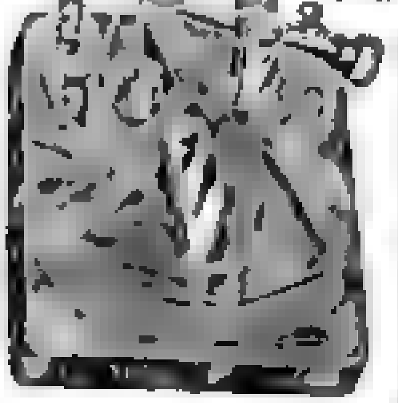

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In the World of Science and Invention

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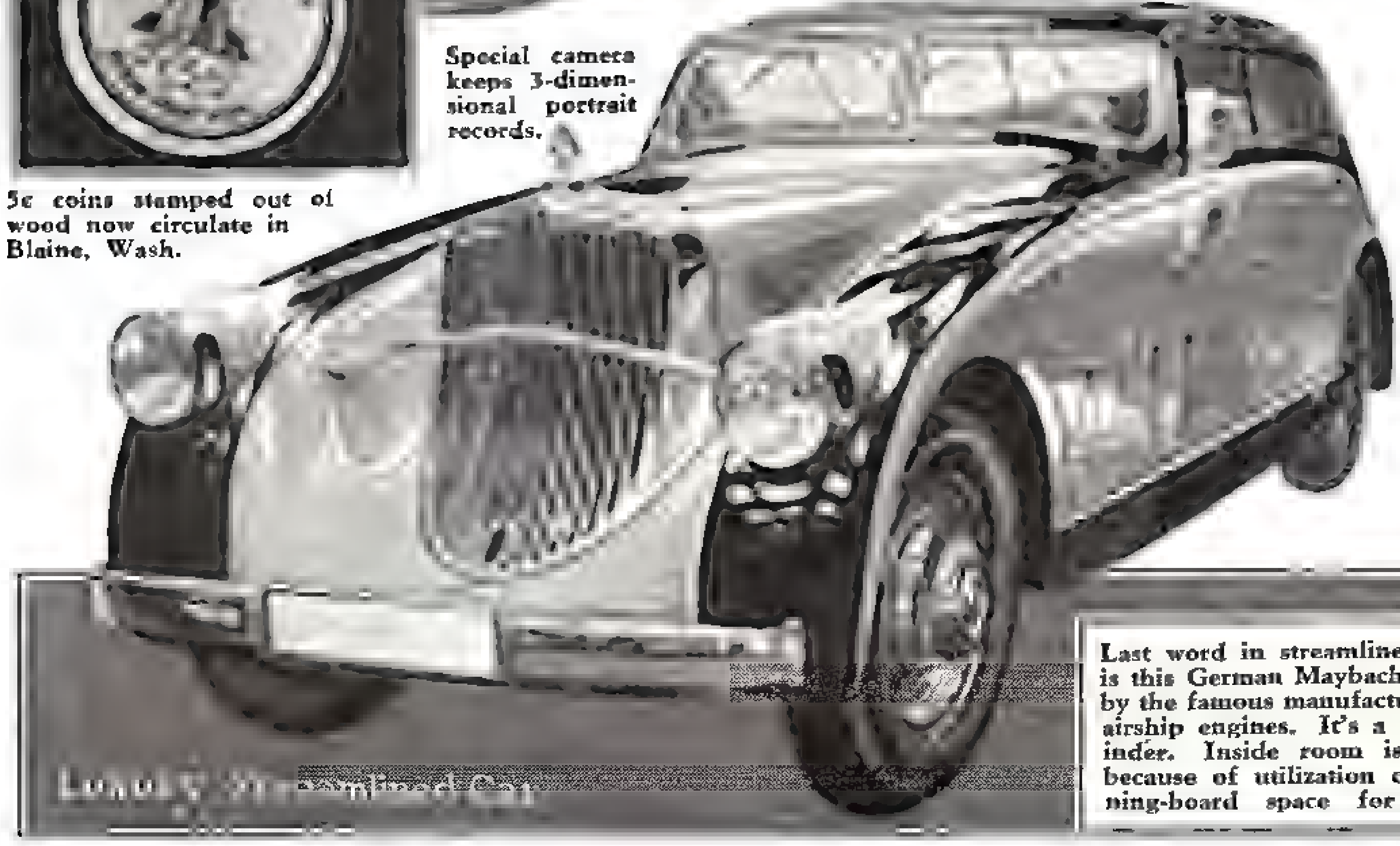
5

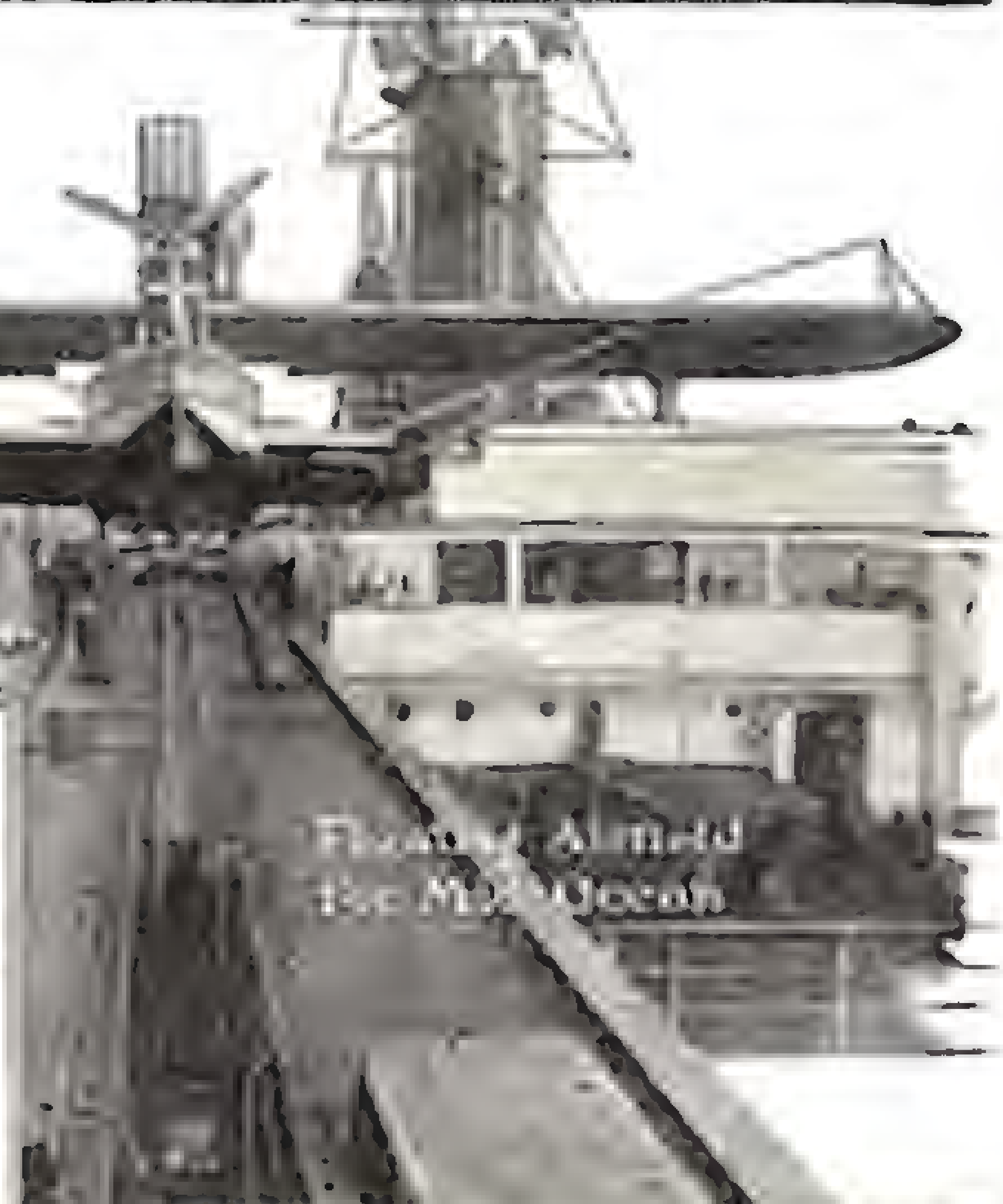
5c coins stamped out of wood now circulate in Blaine, Wash.

Special camera keeps 3-dimensional portrait records.

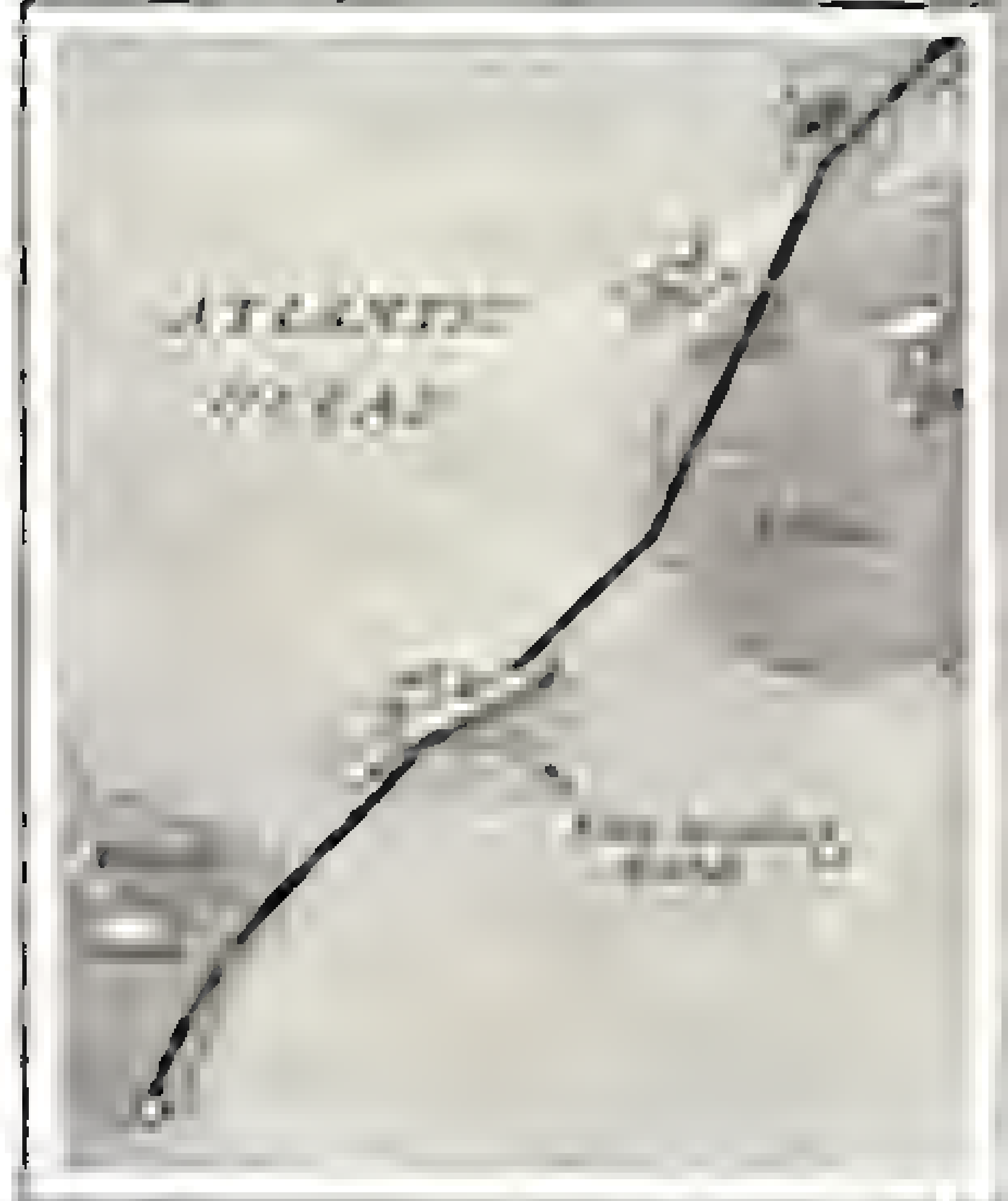
Non-binding garters built right into the sock are the latest boon to men bothered with complaint of slipping-sockitis.



Last word in streamlined cars is this German Maybach, built by the famous manufacturer of airship engines. It's a 12-cylinder. Inside room is great because of utilization of running-board space for seats.

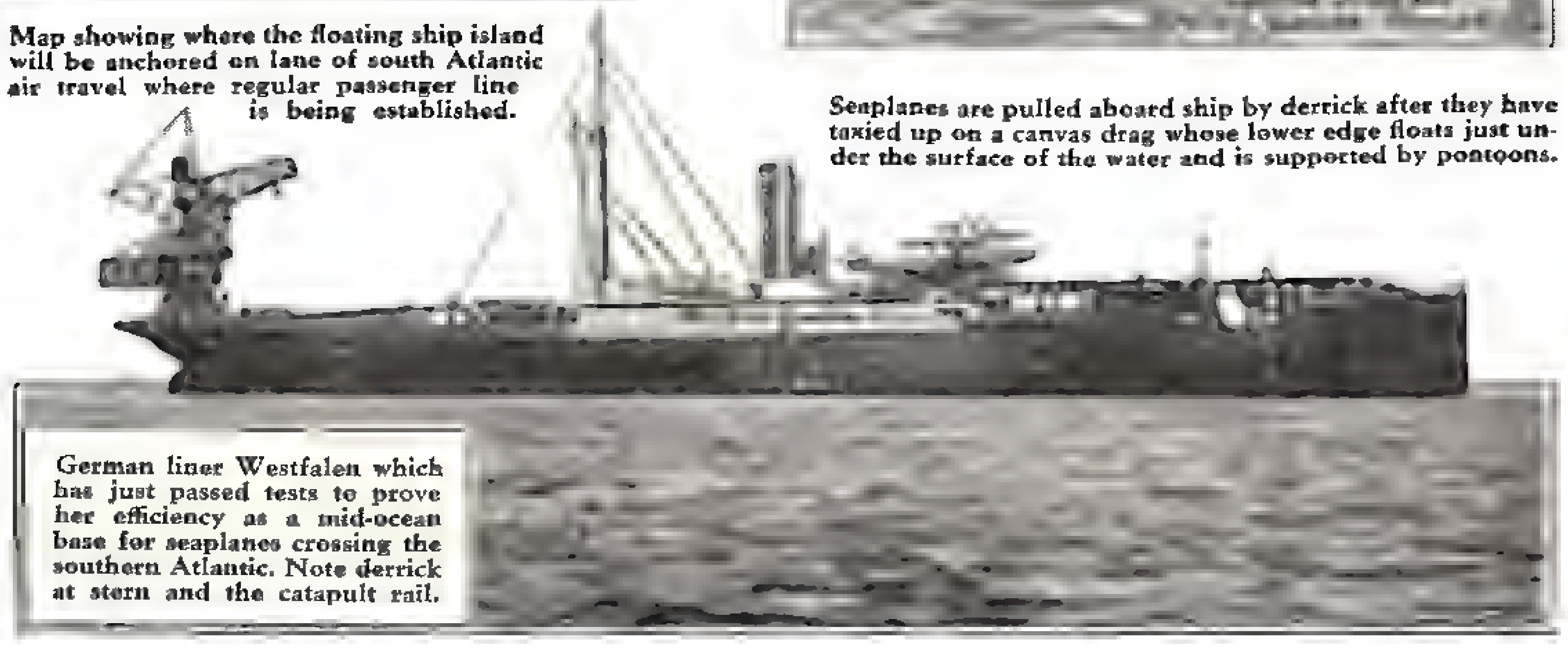


Special catapult for launching seaplanes is built lengthwise of the floating airport.



Map showing where the floating ship island will be anchored on lane of south Atlantic air travel where regular passenger line is being established.

Seaplanes are pulled aboard ship by derrick after they have taxied up on a canvas drag whose lower edge floats just under the surface of the water and is supported by pontoons.



German liner Westfalen which has just passed tests to prove her efficiency as a mid-ocean base for seaplanes crossing the southern Atlantic. Note derrick at stern and the catapult rail.

Jap Pilots Ride to DEATH on Flying BOMBS

by RAY HOLT

The current conflict between Japan and China has brought out an amazing revelation of the methods by which Japanese pilots assure air bombs reaching their target by putting a man inside to steer them. Why? Read the reasons in this article, and you'll have a better understanding of Japanese psychology toward the machines of war.

IMAGINE yourself strapped within a hollow chamber inside a huge air bomb, surrounded on all sides by high explosives. In front of you is an airplane type rudder which steers the tail unit of the bomb. Windows in the nose enable you to see ahead.

You're loaded into the bomb, which is placed in its nest under the fuselage of a bombing plane. The bomber takes off, soars above a target—say, an ammunition dump of the enemy. Up above you, the pilot of the plane pulls a lever.

Down you go, plunging toward the ground with terrific speed. You see that you aren't going to strike the ammunition dump, but will land many yards to one side of it. So you twist the control rudder, swerving the bomb's course. Success! The dump looms up directly below the windows of your bomb. And that is practically the end of things for you.

Sounds like the superheated imagining of a Jules Verne, doesn't it—the sort of absurdity that a sensible man would laugh off as being unheard of, an astounding, amusing impossibility?

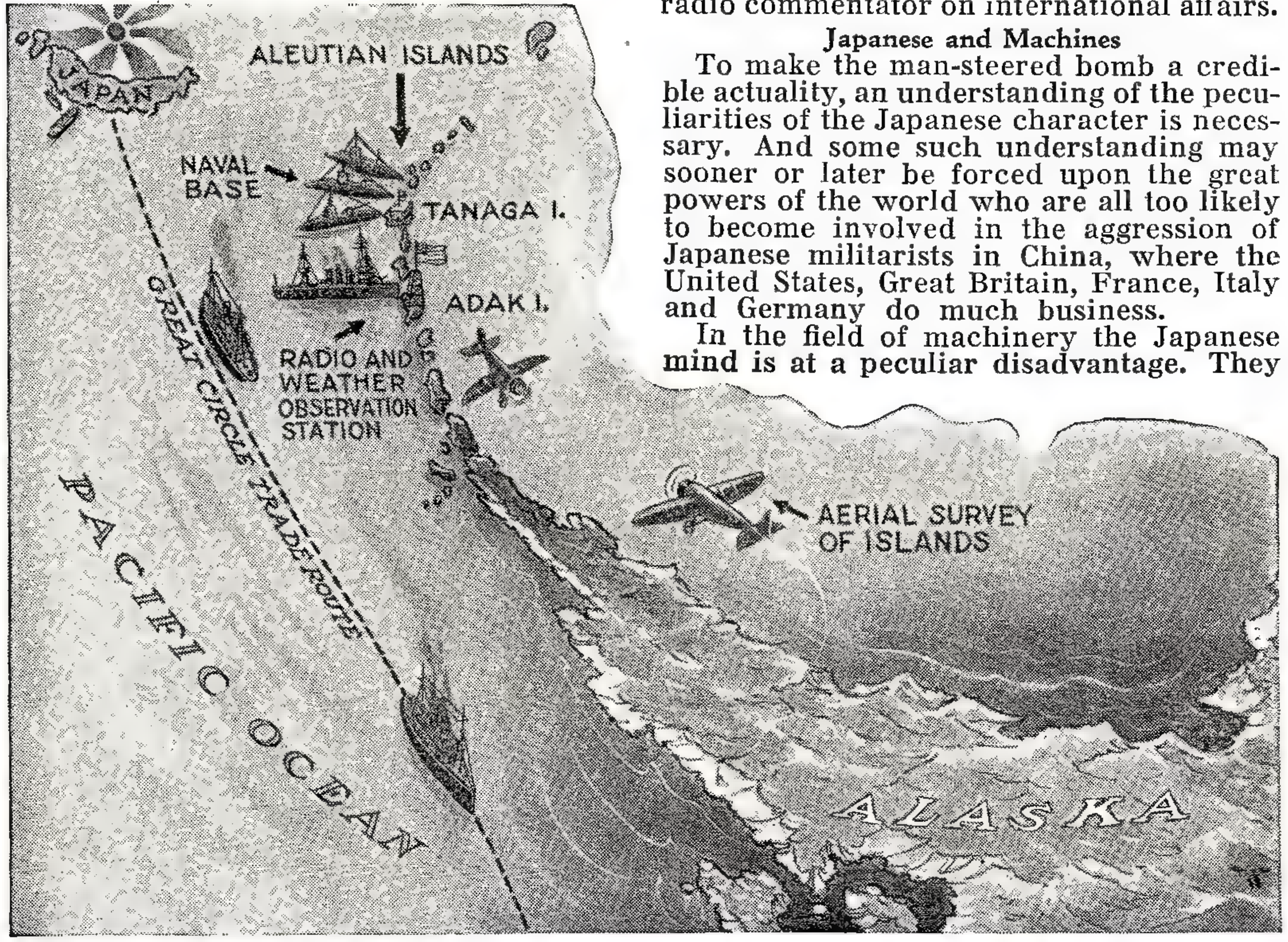
It's nothing of the sort. It's an actual fact of warfare, a method used by Japanese pilots who deem it an honor transcending all others to ride to glory for the mother country. They know that their memory and their families will be forever honored in their homeland.

Rumors of the flying bomb death ride have filtered out of the conflict now being waged by the Japanese and Chinese. Necessarily this information has been of a confidential, undercover nature, but not long ago it was given nation-wide publicity by a radio commentator on international affairs.

Japanese and Machines

To make the man-steered bomb a credible actuality, an understanding of the peculiarities of the Japanese character is necessary. And some such understanding may sooner or later be forced upon the great powers of the world who are all too likely to become involved in the aggression of Japanese militarists in China, where the United States, Great Britain, France, Italy and Germany do much business.

In the field of machinery the Japanese mind is at a peculiar disadvantage. They are able to turn out an exact copy of any mechanism that comes into their hands, but the type of mechanical imagination which went into its original creation—which, for want of a better term, is sometimes known as Yankee ingenuity—they are at a loss to duplicate.



Where the U. S. government expedition is now conducting a survey of the Aleutian islands, looking toward the possibility of establishing weather station, air base, naval base and possible fortifications. Note the proximity of the islands to Japan and the great circle course of steamers. Planes are being taken with which to make an aerial survey of the islands.

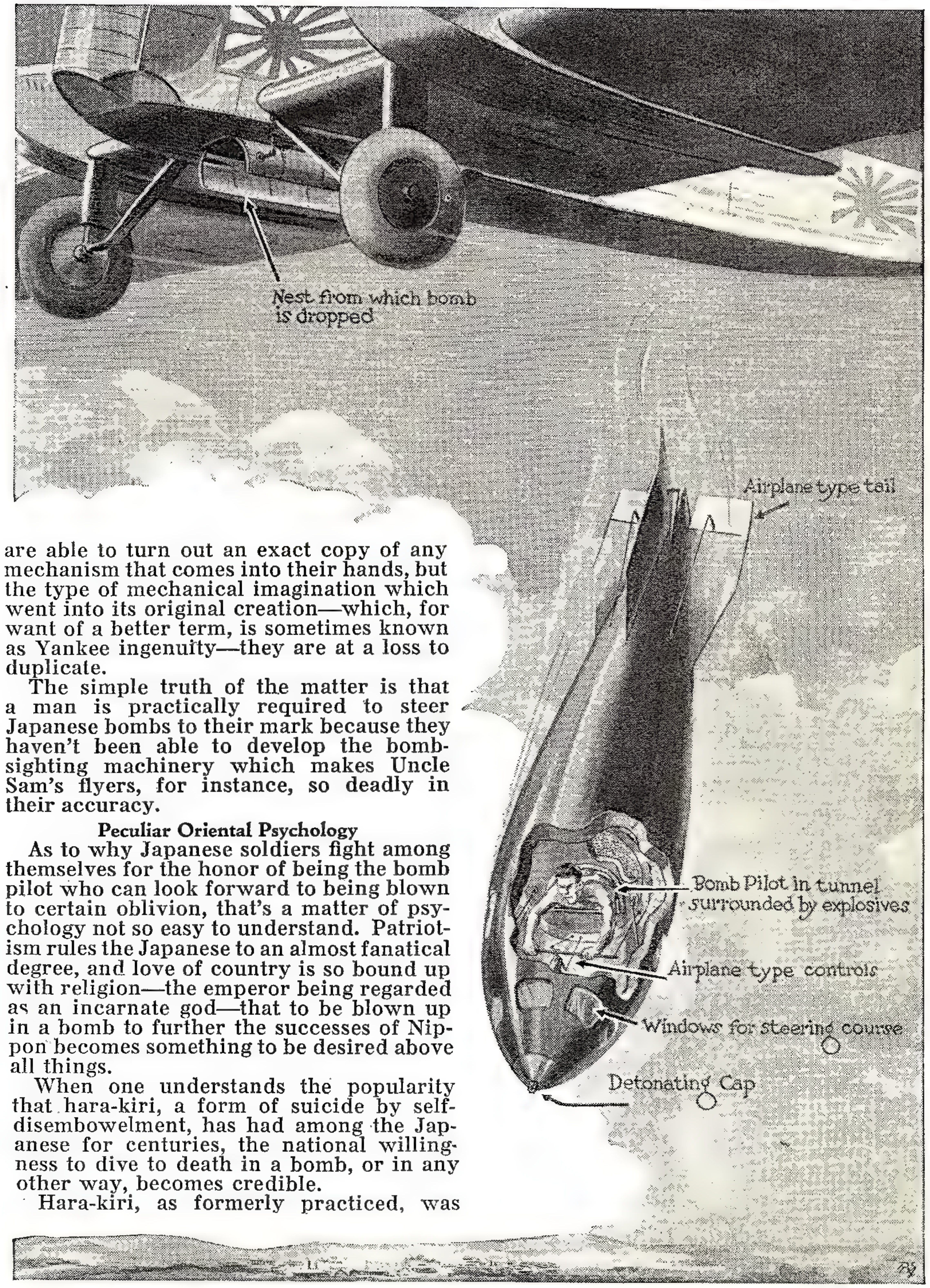
The simple truth of the matter is that a man is practically required to steer Japanese bombs to their mark because they haven't been able to develop the bomb-sighting machinery which makes Uncle Sam's flyers, for instance, so deadly in their accuracy.

Peculiar Oriental Psychology

As to why Japanese soldiers fight among themselves for the honor of being the bomb pilot who can look forward to being blown to certain oblivion, that's a matter of psychology not so easy to understand. Patriotism rules the Japanese to an almost fanatical degree, and love of country is so bound up with religion—the emperor being regarded as an incarnate god—that to be blown up in a bomb to further the successes of Nippon becomes something to be desired above all things.

When one understands the popularity that hara-kiri, a form of suicide by self-disembowelment, has had among the Japanese for centuries, the national willingness to dive to death in a bomb, or in any other way, becomes credible.

Hara-kiri, as formerly practiced, was


Nest from which bomb is dropped
Airplane type tail
Bomb Pilot in tunnel surrounded by explosives
Airplane type controls
Windows for steering course
Detonating Cap

Riding to glory for the mother land, a Japanese pilot inside a bomb dropped from an airplane steers it to destruction because Japanese mechanics are unable to design elaborate sighting devices which would assure reasonable accuracy.

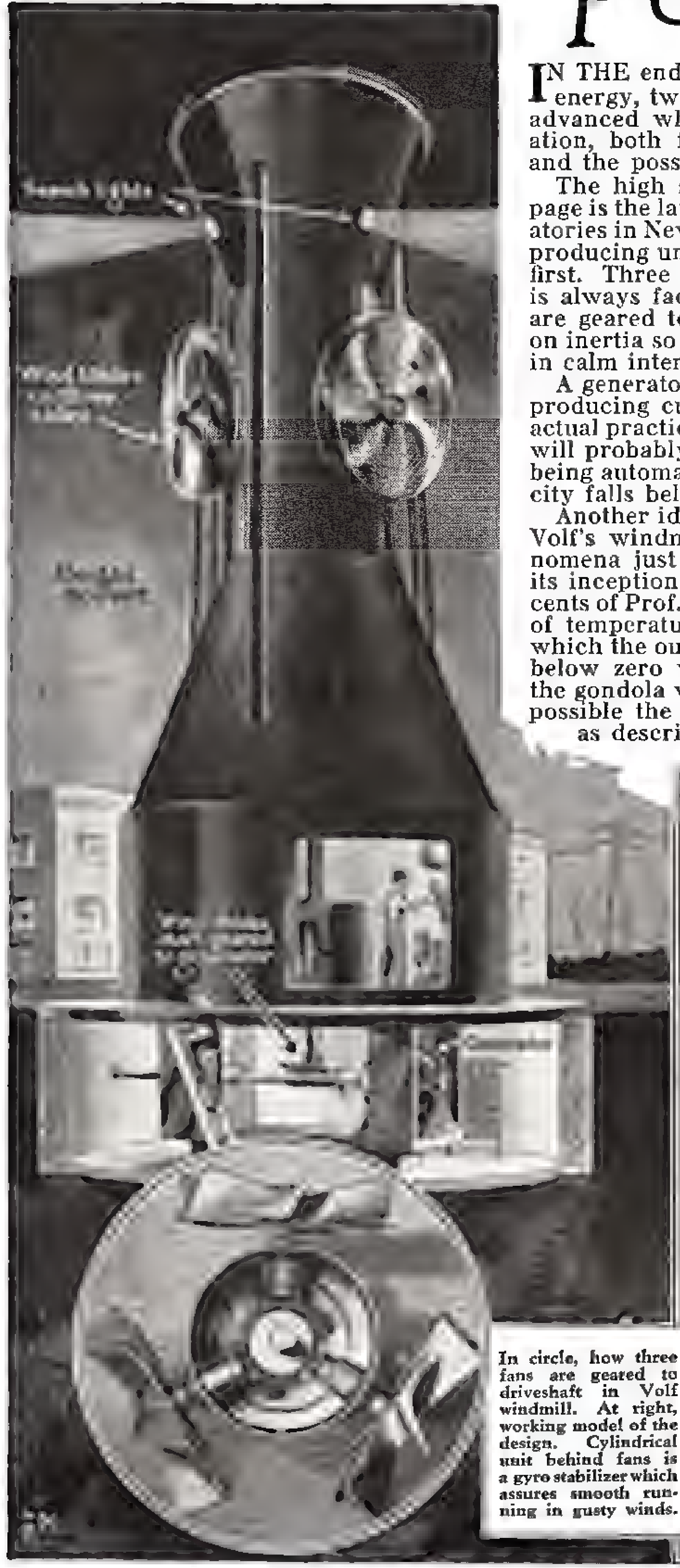
NOVEL NEW MACHINES for PULLING POWER from the SKIES

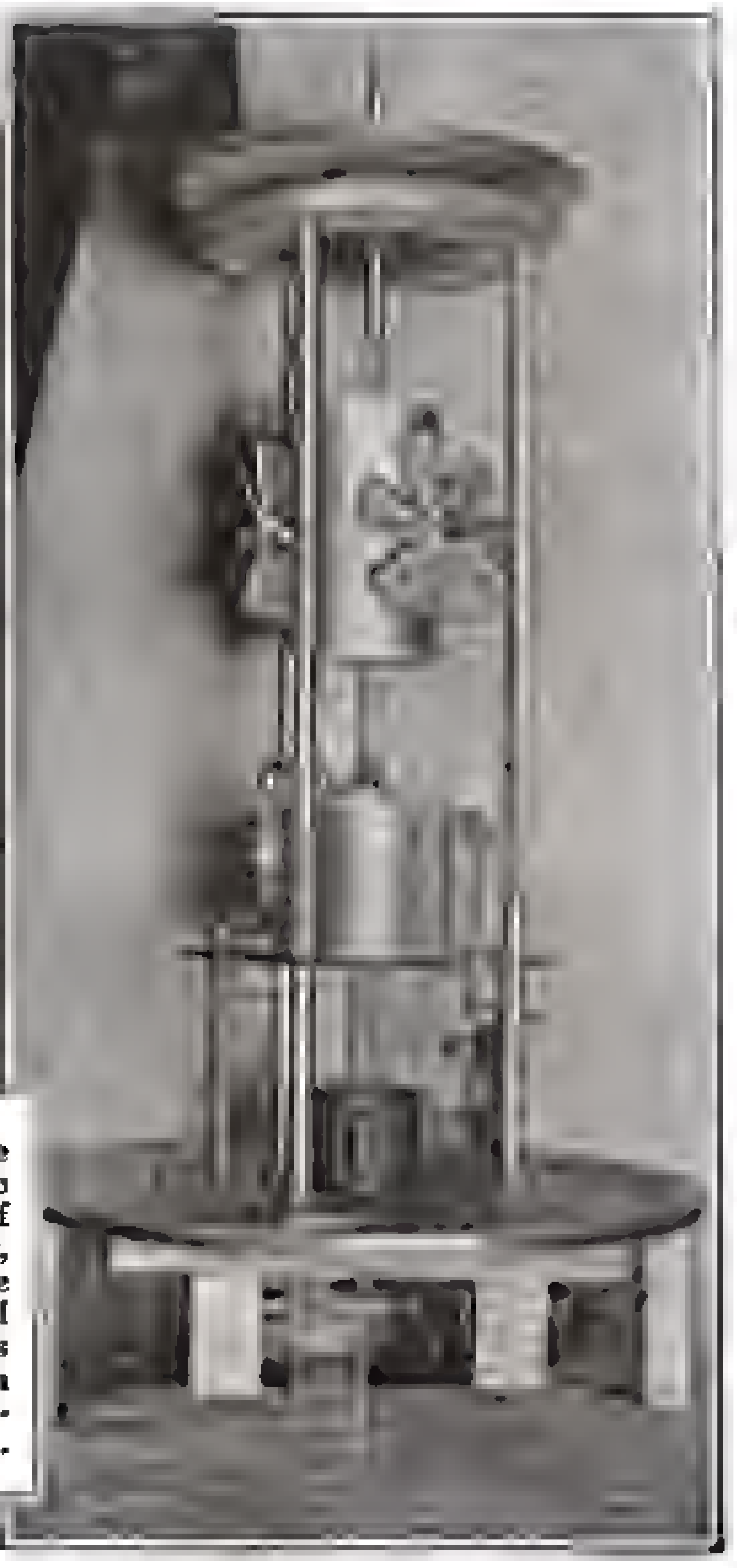
IN THE endless quest for cheap sources of energy, two proposals have recently been advanced which demand serious consideration, both for appeal to the imagination and the possibilities of practical operation.

The high speed windmill shown on this page is the latest development of Volf's laboratories in New York. The first of these power producing units will be in operation by May first. Three fans are provided so that one is always facing a wind current. The fans are geared to a gyro stabilizer which runs on inertia so that the fans will not run down in calm intervals between gusts of wind.

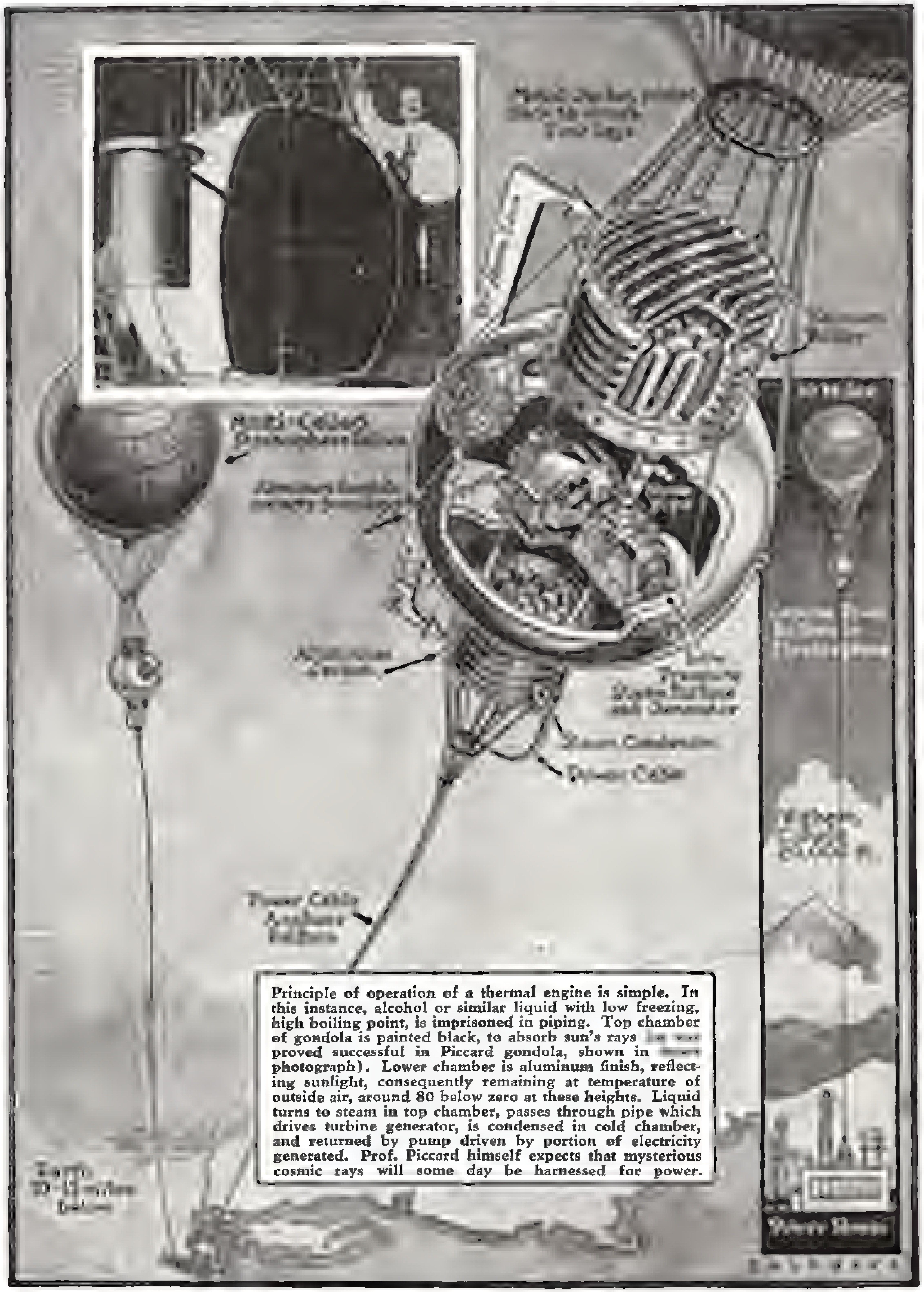
A generator is driven by the geared shaft, producing current for storage batteries. In actual practice three or four small generators will probably be used, one or more of them being automatically cut out when wind velocity falls below a certain point.

Another idea, less close to realization than Volf's windmill but involving natural phenomena just as dependable, partially owes its inception to the stratosphere balloon ascents of Prof. Auguste Piccard. The extremes of temperature encountered by Piccard, in which the outside air was around 75 degrees below zero while interior temperatures of the gondola were around 100 degrees, makes possible the operation of a thermal engine as described in detail on opposite page.





In circle, how three fans are geared to driveshaft in Volf windmill. At right, working model of the design. Cylindrical unit behind fans is a gyro stabilizer which assures smooth running in gusty winds.



Principle of operation of a thermal engine is simple. In this instance, alcohol or similar liquid with low freezing, high boiling point, is imprisoned in piping. Top chamber of gondola is painted black, to absorb sun's rays (as was proved successful in Piccard gondola, shown in inset photograph). Lower chamber is aluminum finish, reflecting sunlight, consequently remaining at temperature of outside air, around 80 below zero at these heights. Liquid turns to steam in top chamber, passes through pipe which drives turbine generator, is condensed in cold chamber, and returned by pump driven by portion of electricity generated. Prof. Piccard himself expects that mysterious cosmic rays will some day be harnessed for power.

This thermal power plant, anchored by captive balloon high above the clouds to operate through heat of sun and cold of atmosphere, is an idea based on sound physical laws, demonstrated in Piccard balloon ascent a year ago.

When You've Found Gold—SLUICE 'er OUT!

by Arthur Hawthorne Carhart

Sluicing methods have not changed radically from early days. This photo, taken in the sixties near Central City, Colorado, shows a group of miners shoveling pay dirt into a sluice fundamentally identical to those in use today for hand operations.

EDITOR'S NOTE: *This is the second of a series of articles on prospecting and recovery methods used in the new gold rush. The first article, which appeared in the April issue of Modern Mechanix and Inventions, described methods of locating paying gold deposits.*

YOU have found gold!

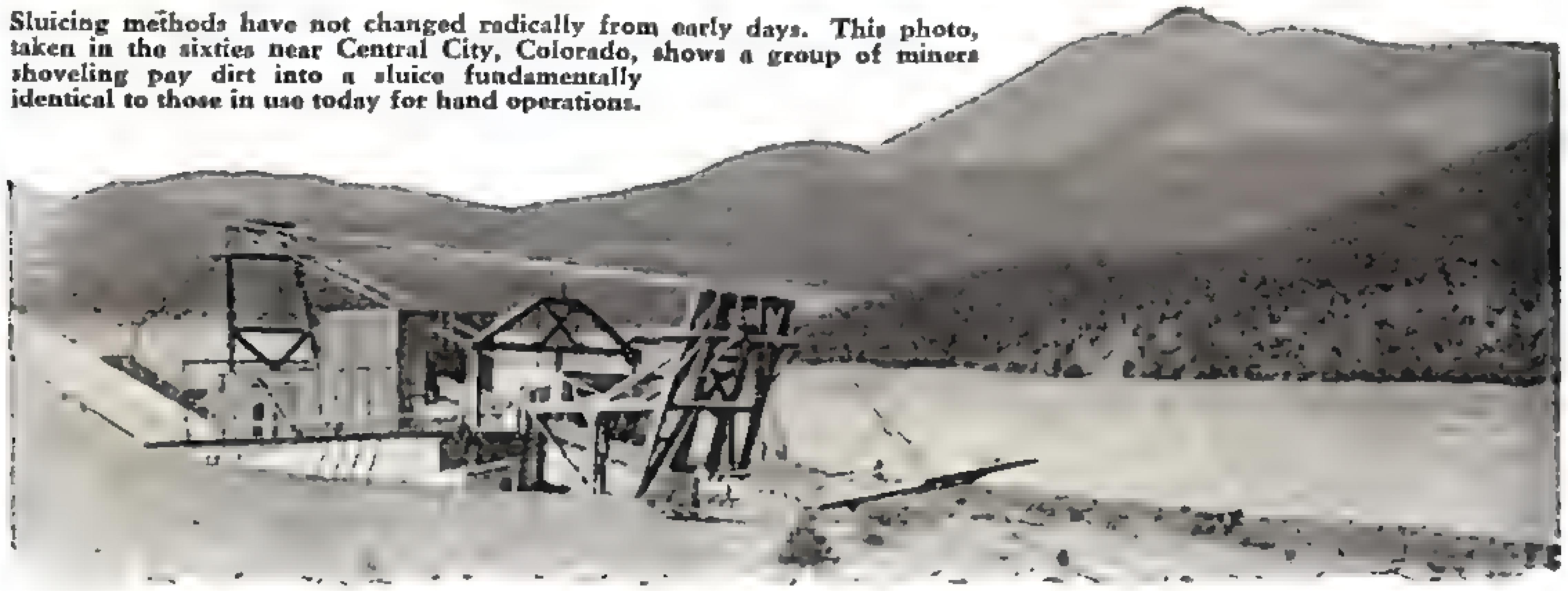
But the ground is not rich enough to make wages by hand panning. Still, if you could handle two yards instead of a half yard, you would make good wages. You keep on testing with the pan to see how much placer ground you have found and how rich it may be.

As you do this you keep your pan clean, especially free from grease, and you have picked out a number of particles of placer gold large enough to be handled with a fine pair of tweezers. The finer concentrates you keep separately to be refined or you have amalgamated them with "quick" (mercury) and will send them to some metallurgist. You cannot risk the poison fumes of the mercury or you might do the refining of the amalgam yourself.

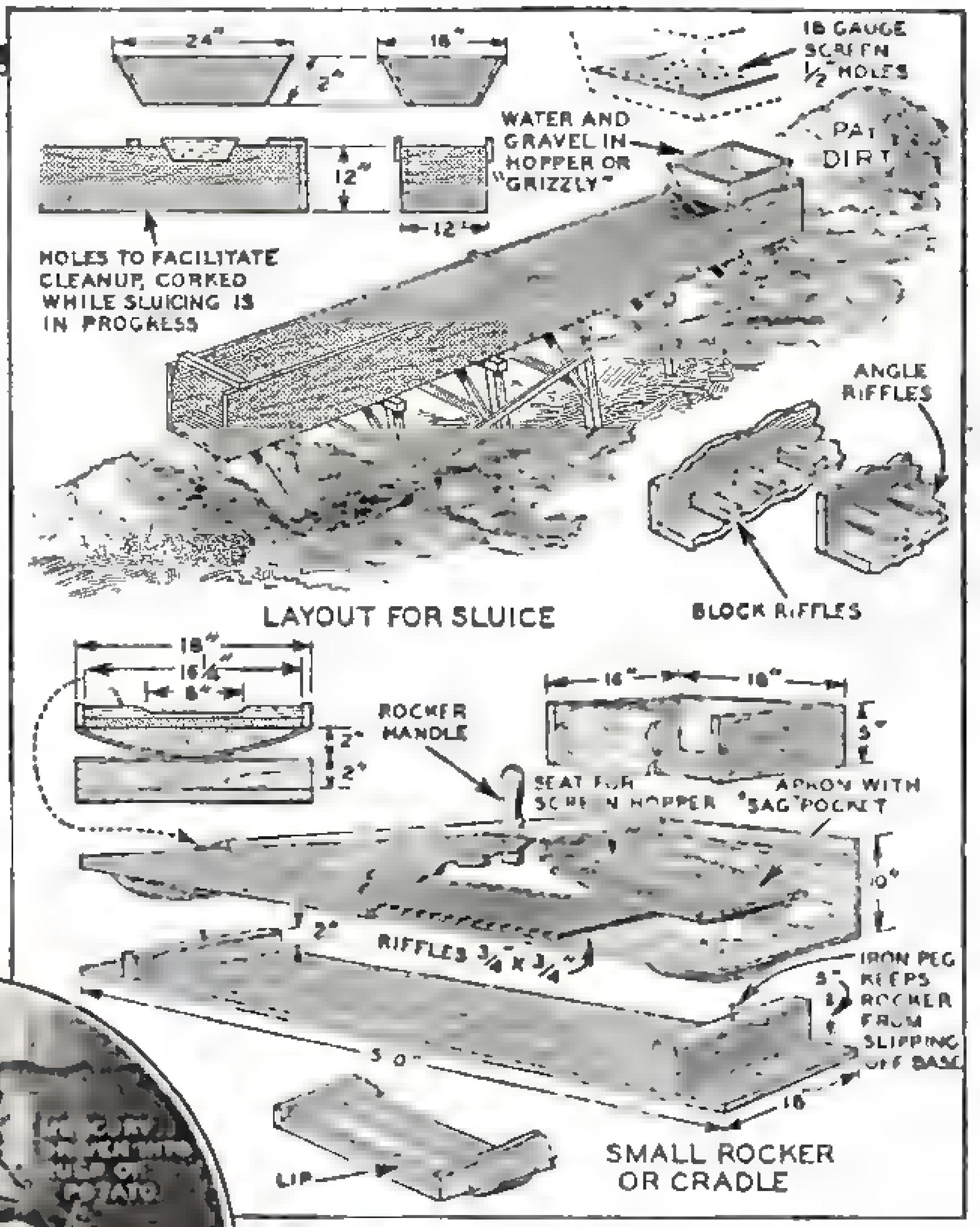
There is one way you can do this without much danger and with small quantities of amalgam. By putting the amalgam inside a big raw potato, then baking it in a fire outdoors, until well done, the mercury will be driven out into the potato pulp, leaving a button of gold. Unwire the potato, put away the gold, squeeze the mercury out of the cooked potato by hand, using a basin of water to help the separation.

But all your panning has shown you must increase your efficiency, handle four to six times as much earth per man per day, if you are going to make wages. How to do it!

The actual business of working placers ranges from the hand panning of very rich, limited pockets to expensive dredges that cost several hundred thousand dollars, but operate profitably in low grade dirt. More recently there are "placer machines" costing from $200 to $30,000 that handle low grade dirt to advantage. Right off you say you are not interested in any such bulk-handling machinery. But if you have located a big



Dredges enable gold to be recovered at a profit from placers too poor to be worked by hand. Dirt as poor as 15 cents to the ton returns a handsome profit through use of dredges like this. Of course, deposit has to be of considerable extent. Capital can be interested to the extent of supplying dredges if the prospector can prove the productivity of his placer field on the basis of test borings extending clear down to bedrock. Thousands of tons are handled per day in this manner.



Construction of a sluice and details of a rocker or cradle are given in the drawing. Gold amalgamated with mercury is recovered by putting inside a potato; heat will drive mercury into pulp, leaving gold for recovery.

Compare the gold rush of 1932, pictured in the photo above, with the photograph of the fifty-niners at work on the opposite page. Man power plus pay dirt plus a knowledge of the tricks of the trade, wins a living wage for hundreds of present-day prospectors who are combing gold-bearing territories. And there's always possibility of scoring a ten-strike. When intending to try their luck in the field they should know how to identify gold when they have found it, and how to recover it profitably when found—information which is all contained in this interesting series of articles.

A Complete COAL MINE in a MUSEUM Room!

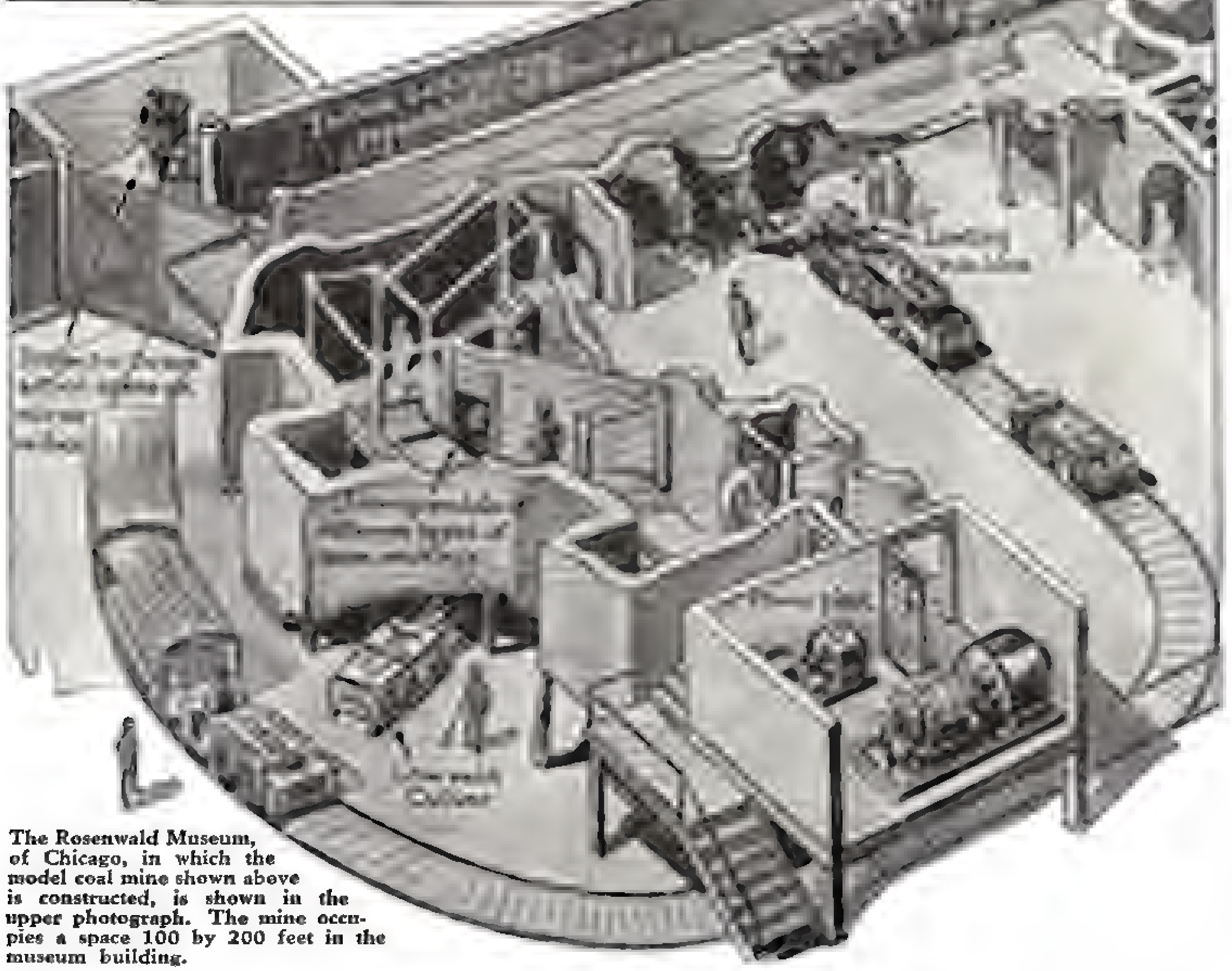
WHEN the Rosenwald Museum of Science and Industry opens in Chicago May 1, visitors will be treated to a trip through a real, working coal mine, despite the fact that the nearest coal deposits are 200 miles away.

They will descend in a real mine cage to a depth of 500 feet and take a trip of more than a mile on a real mine train through the workings. Or at least, such will be their impression. Actually the descent will be but 50 feet, to the museum's sub-basement, and the entire mine is packed into a space of less than 100 by 200 feet on two floors.

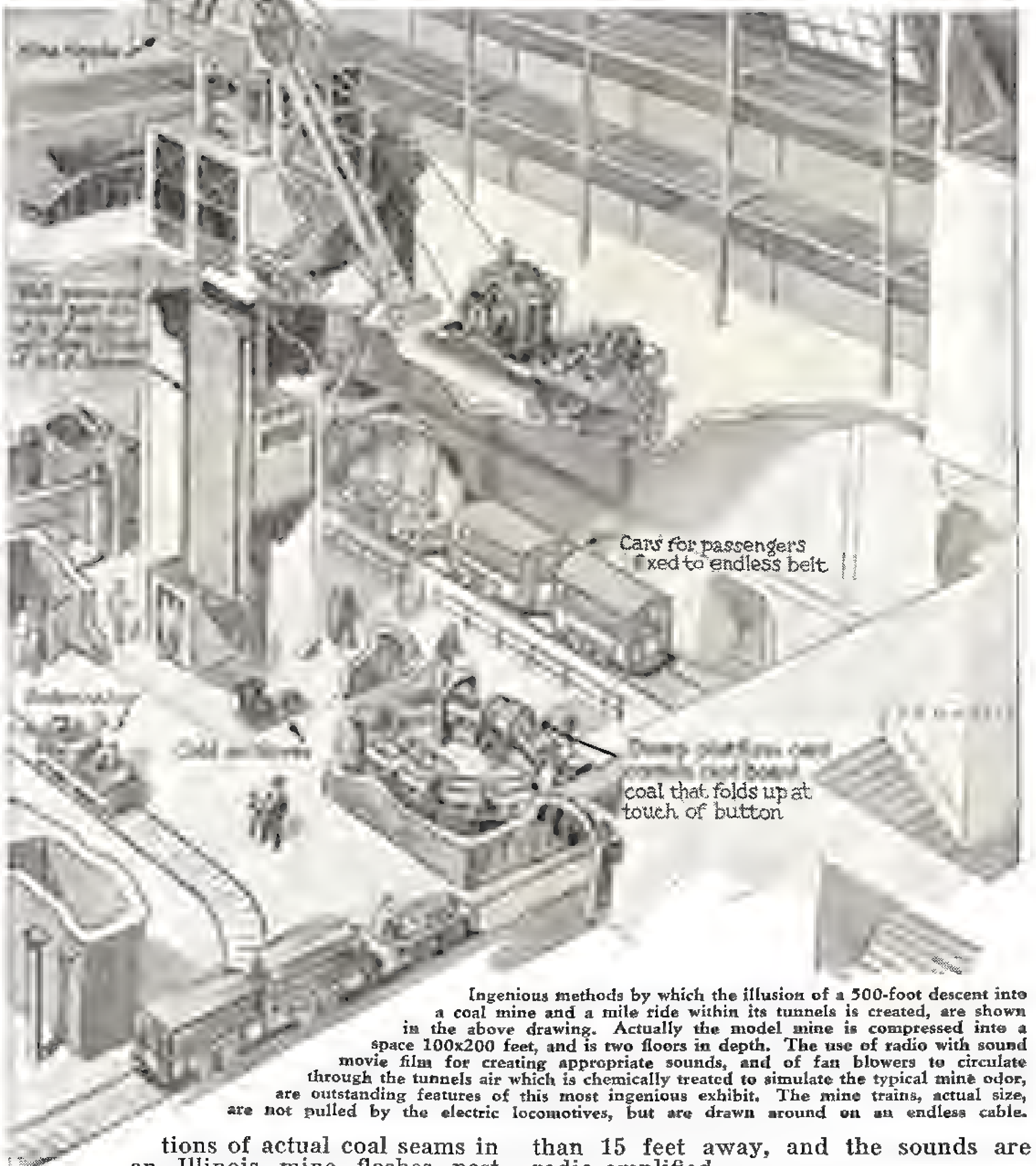
Visitors will descend in a real mine car capable of holding 30 passengers. The car starts, stopping without the passengers realizing it while 450 feet of shaft wall, on an endless belt, flashes before their eyes to give the illusion of continuous descent. At the same time they feel the rush of cool mine air, chemically charged with the decayed vegetation odor of a mine, forced from a blower at the bottom of the shaft.

Emerging, they watch an endless string of coal cars being unloaded. Illusion again! The "coal" is a cork imitation, wired to a screen on top of the cars which folds up and disappears at the touch of a button. Simultaneously a can of gravel, attached to a microphone and radio amplifiers, is tipped into a metal hopper to produce the din of coal sliding down a chute.

The visitors get into two mine cars, apparently pulled by an electric locomotive. They round a corner, pass through a fire door, and roar down a stretch of track. Actually, the train stops while an endless belt, carrying papier-mache reproductions of actual coal seams in an Illinois mine flashes past them. Fan blowers, radio amplified sounds, and a sparking trolley wire overhead complete the illusion of motion.



The Rosenwald Museum, of Chicago, in which the model coal mine shown above is constructed, is shown in the upper photograph. The mine occupies a space 100 by 200 feet in the museum building.


Cars for passengers fixed to endless belt
coal that folds up at touch of button

Ingenious methods by which the illusion of a 500-foot descent into a coal mine and a mile ride within its tunnels is created, are shown in the above drawing. Actually the model mine is compressed into a space 100x200 feet, and is two floors in depth. The use of radio with sound movie film for creating appropriate sounds, and of fan blowers to circulate through the tunnels air which is chemically treated to simulate the typical mine odor, are outstanding features of this most ingenious exhibit. The mine trains, actual size, are not pulled by the electric locomotives, but are drawn around on an endless cable.

The mine train is one of three, each mounted on the same cable which circles around the mine. The locomotive does no hauling. While one train is being loaded, the other has stopped opposite the moving walls, while the third pauses alongside a low-vein cutting machine in action. In traveling alongside the moving walls, long, dimly-lighted galleries are seen leading off into the distance, where trains of loaded cars can be seen and heard rumbling over crossings. The trains, toy size, are less than 15 feet away, and the sounds are radio amplified.

A real battery of mine pumps will be seen in operation, pumping real water trickling down the gutters. The operators of the machines are also genuine, being union miners from southern Illinois.

From the operating mine, visitors will pass through another type of mine, where the vein ascends on a slant, instead of being laid flat.

That is all that will be in operation this summer, but later the journey will continue through lead, zinc, silver, gold, and diamond mines, finally ending up with a 1,200-foot ascent in another mine car (again compressed into 50 feet).

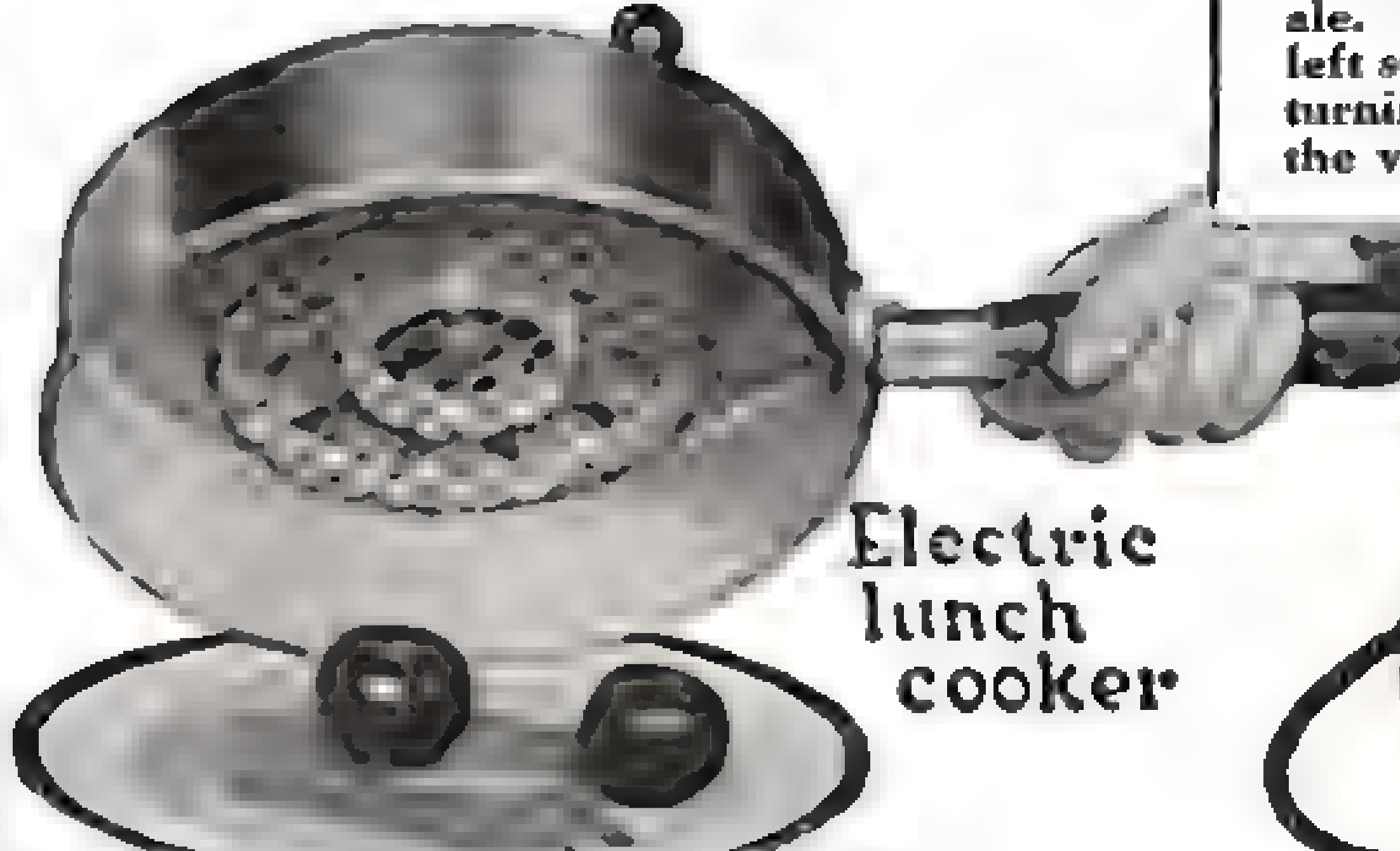
Housekeeping Made Easier With These New Devices

Shuttered lamp shade

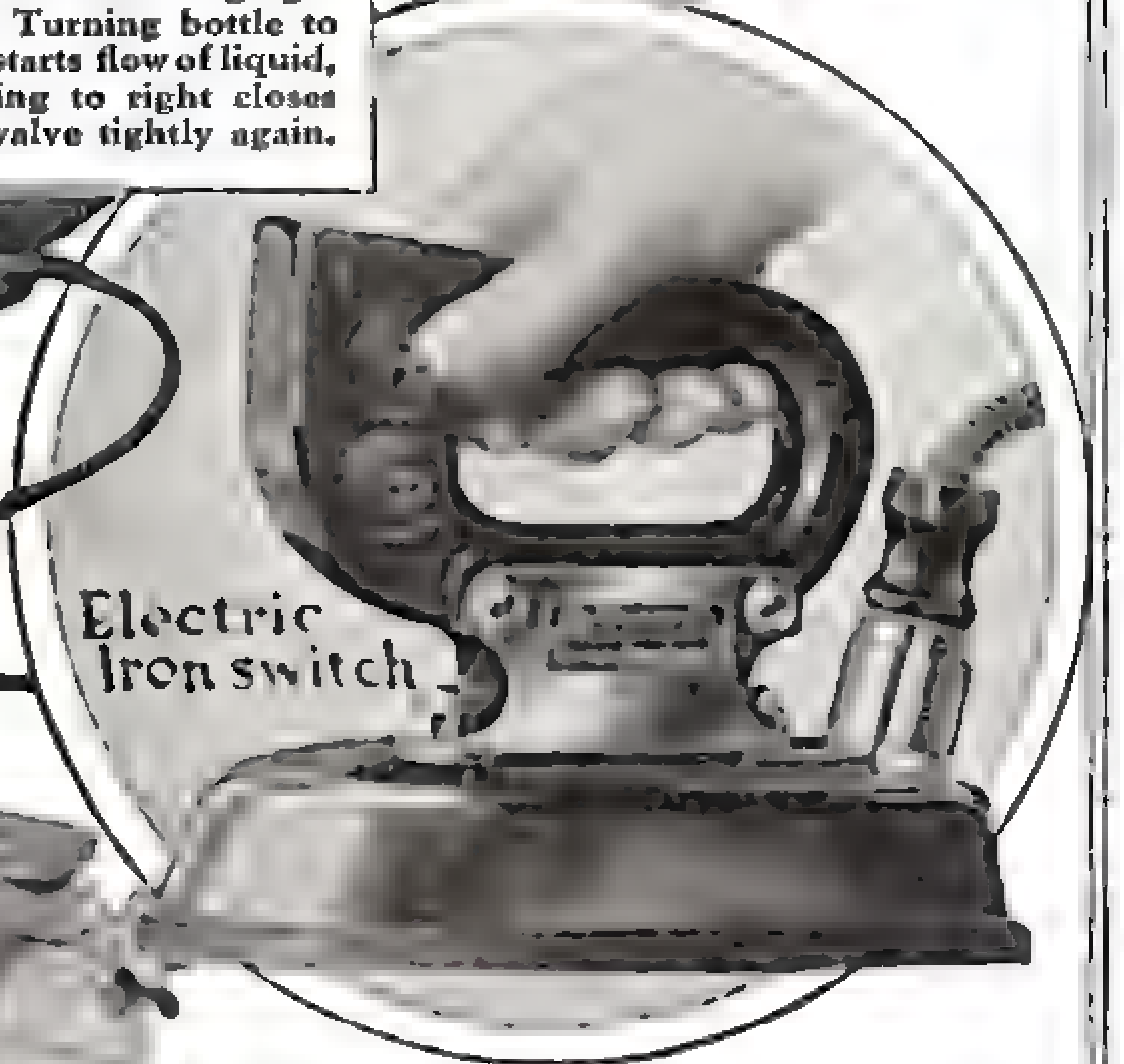
Shuttered sides and bottom of new lampshade permit adjustment for any degree of light.

Ginger ale Dispenser

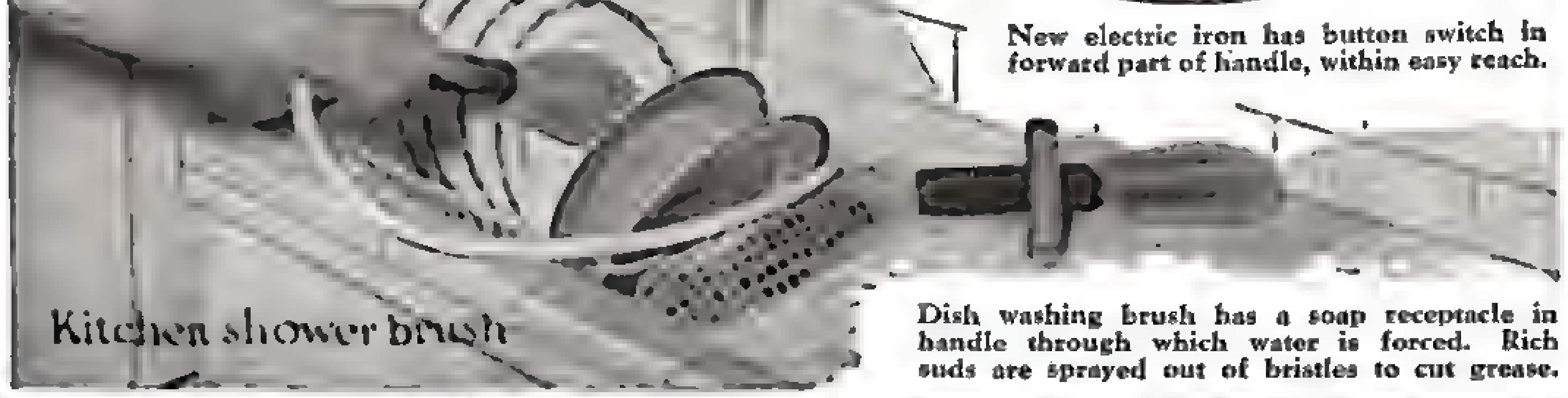
Handy dispenser punches hole in bottle cap, utilizing gas pressure to deliver ginger ale. Turning bottle to left starts flow of liquid, turning to right closes the valve tightly again.


Electric lunch cooker

Breakfasts, lunches are prepared quickly by placing this electric cooker over dish in which edibles are contained, as demonstrated.


Electric Iron switch

New electric iron has button switch in forward part of handle, within easy reach.


Kitchen shower brush

Dish washing brush has a soap receptacle in handle through which water is forced. Rich suds are sprayed out of bristles to cut grease.

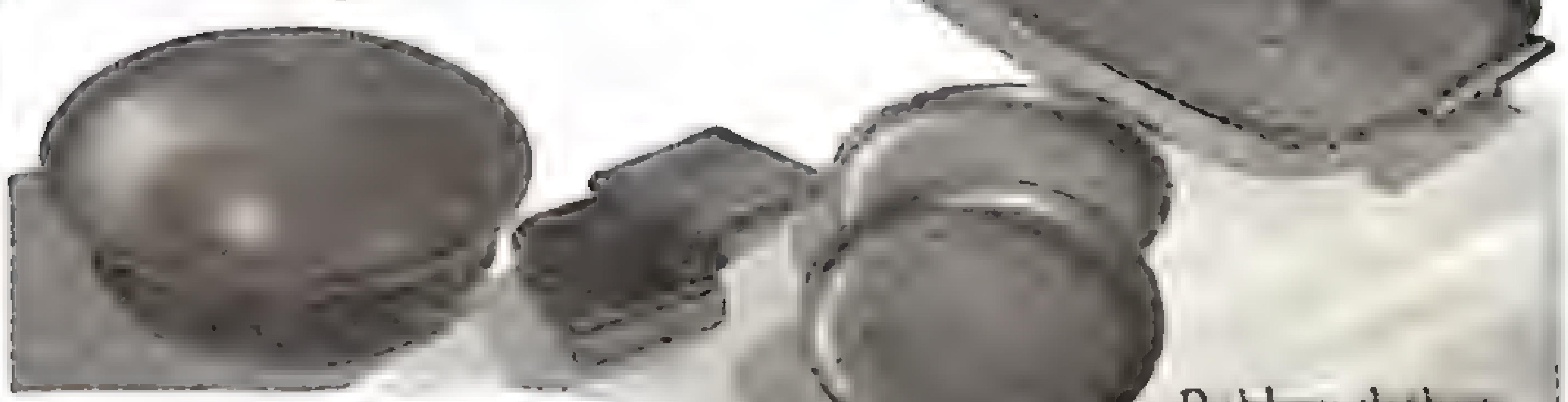
Mere twist of the jar unscrews cap when it is wedged into jaws of this new opener. Fastens onto wall with two screws and is adjustable to take any size lid. Device is also convenient to put lids on tightly.

Rack to burn Magazines

Conserve coal by burning old magazines, which last for 25 minutes when suspended from wires on grate rack as shown.

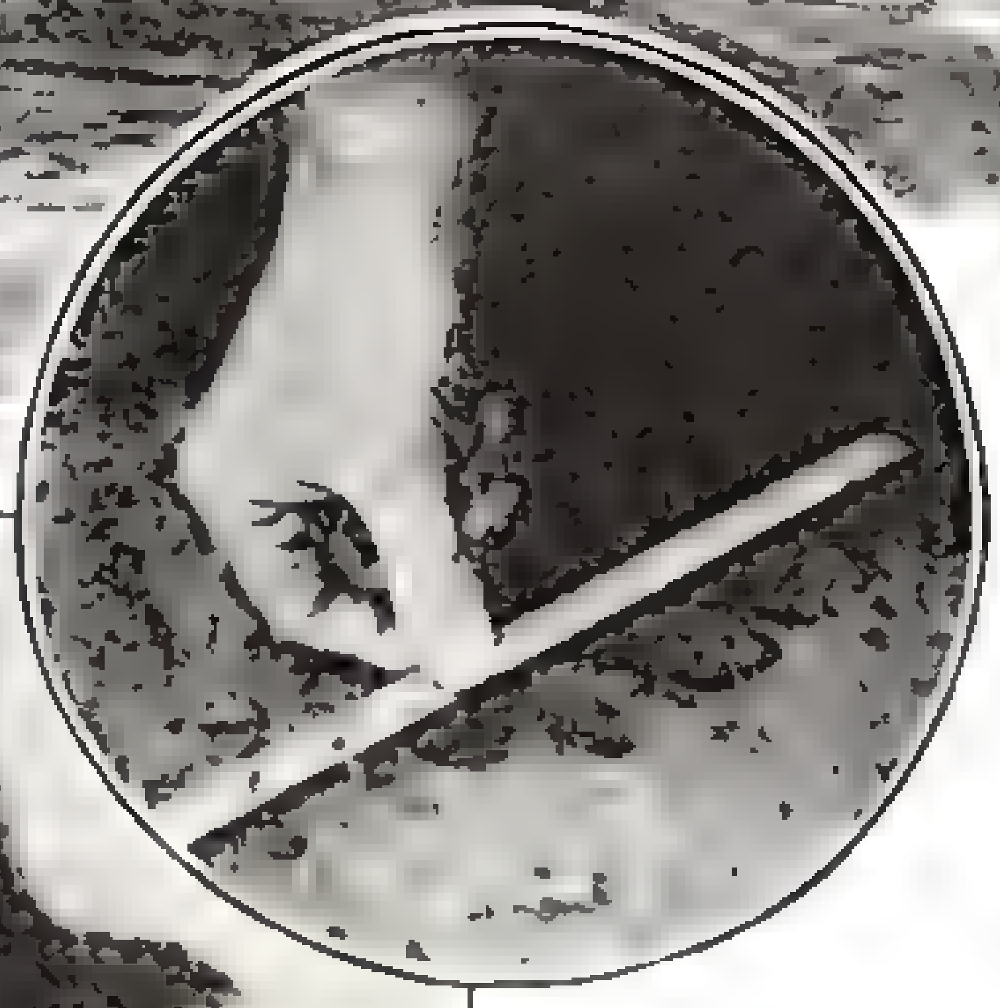
Revolving wall cabinet

Secured to door or wall, new type cabinet swings around completely out of the way to solve problem of limited storage space.


Rubber dishes and Utensils

Unbreakable rubber dishes and utensils are being made from "Plioform," a rubber base product. Resists hot water, will not scratch.

Getting Personal with the World's Biggest Bears



A most remarkable surprise picture of an Alaskan brown bear, snapped at imminent risk to the photographer. No other living animal is a match for the brown bear in quickness and strength. Photo reproduced through courtesy of Nature magazine. In circle, at left, is shown measurement of bear tracks—seven inches across!

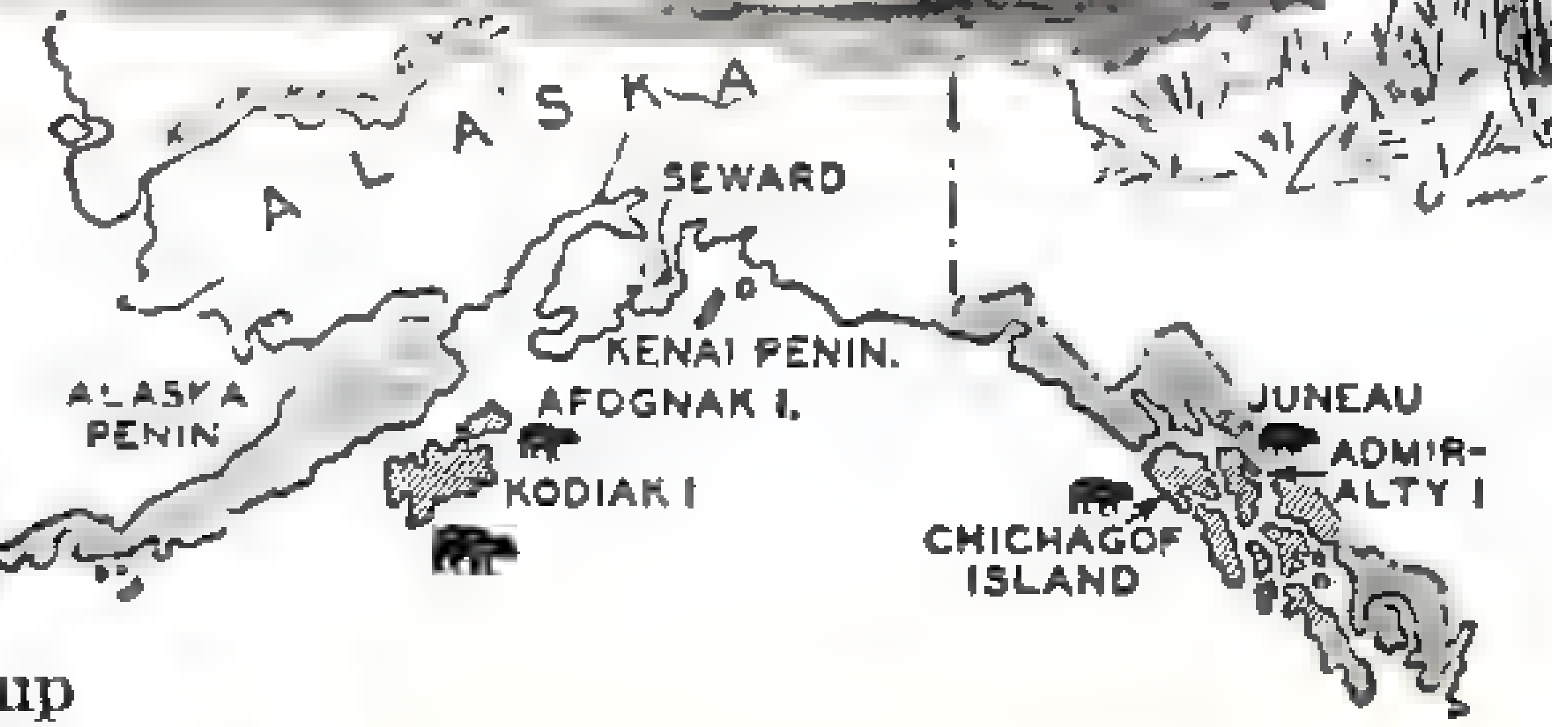
This skin is from a grizzly which weighed 1500 lbs.—some 500 lbs. less than the brown bear attains. Size can be judged by the seven-column newspaper on which the skull rests.

by James Nevin Miller

Have you always believed that the grizzly is the biggest and most dangerous of all bears? If so, it will surprise you to learn that the grizzly averages about half the size of the great Alaskan Brown Bear. This article will upset a lot of your previous notions about bears in general.

WHILE official Washington is all agog about whether the famous brown bear of Alaska, whose tremendous skin ranks among the most prized trophies in the world, is being exterminated by overzealous hunters, almost countless stories are being told by bear experts concerning thrilling and almost unbelievable experiences of hunters, prospectors, guides, naturalists and government investigators who were unfortunate enough to meet some of these jungle monarchs unexpectedly.

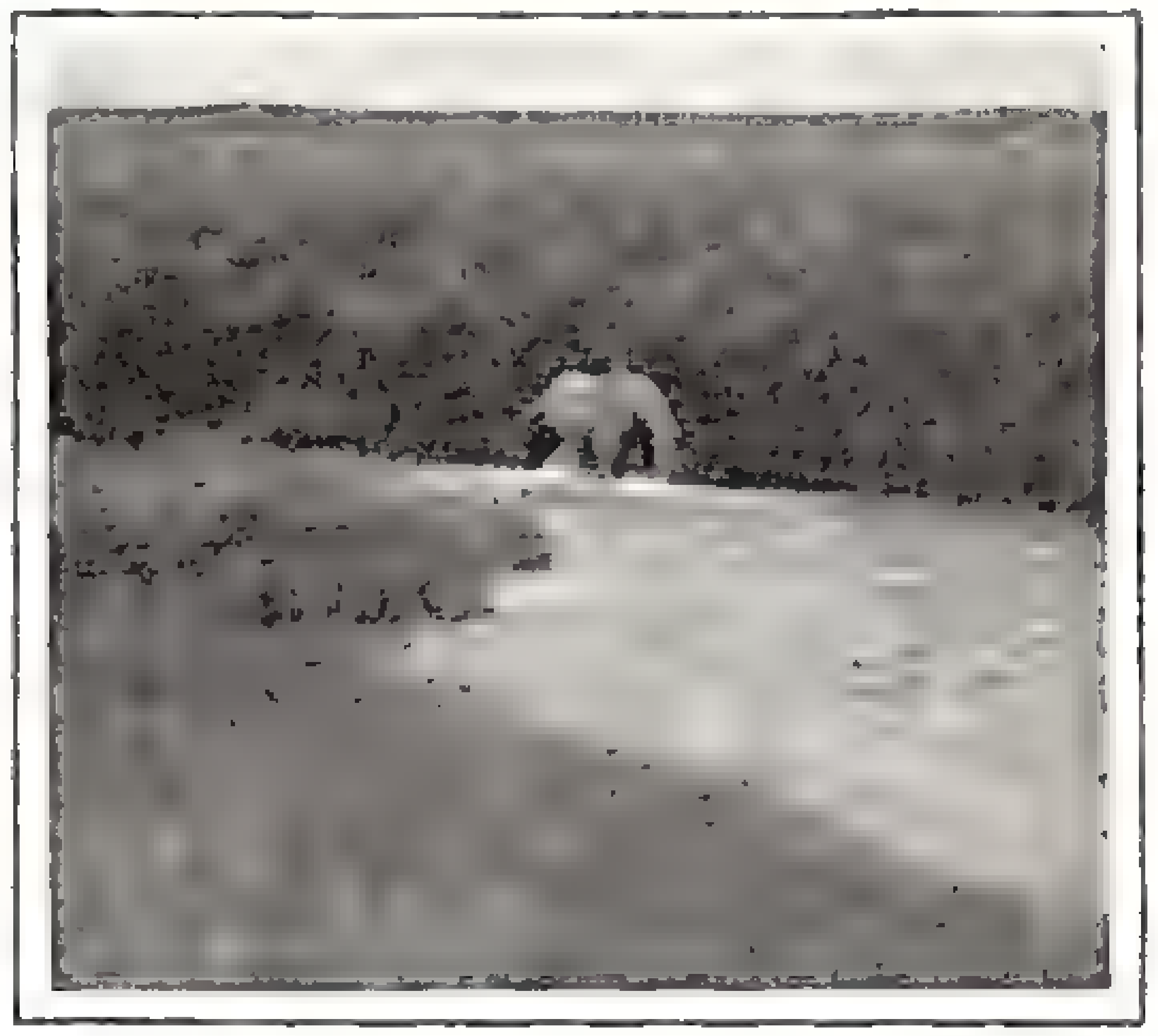
Action! One of the rarest of all brown bear photos, showing a ton of muscle and bone making a bee line toward a hunter who has aroused his anger. A tiger or a lion would be helpless in combat with this powerful beast. The map at right shows habitat of the Alaskan brown bear. Shaded sections indicate areas proposed as game reserve where hunting of such bears shall be restricted. Kodiak and Afognak are the famous islands of the Aleutian group that attract hunters of the brown bear.



The Alaskan brown bears form a group of gigantic animals peculiar to North America and limited to the coast and islands of Alaska from the head of Norton Sound to the Sitka Islands. On Kodiak Island they attain weights sometimes exceeding 2,000 pounds, and their skins have been mounted measuring 13½ feet from tip of nose to tip of tail. They can be likened only to the great cave bears which were the haunting terror of primitive mankind during the old stone age in Europe.

In color the animals vary considerably—from a dull golden-yellowish shade to a dusky brown, becoming almost black in some species. Some of the darker types are indistinguishable from the great grizzlies with which in places they share the range, but the relatively shorter, thicker and more strongly-curved claws on the front feet are distinctive; moreover, the grizzlies average about half the size of the "brownies."

Certain species occupy open, rolling or hilly tundras and others live on the steepest and most rugged mountain slopes and



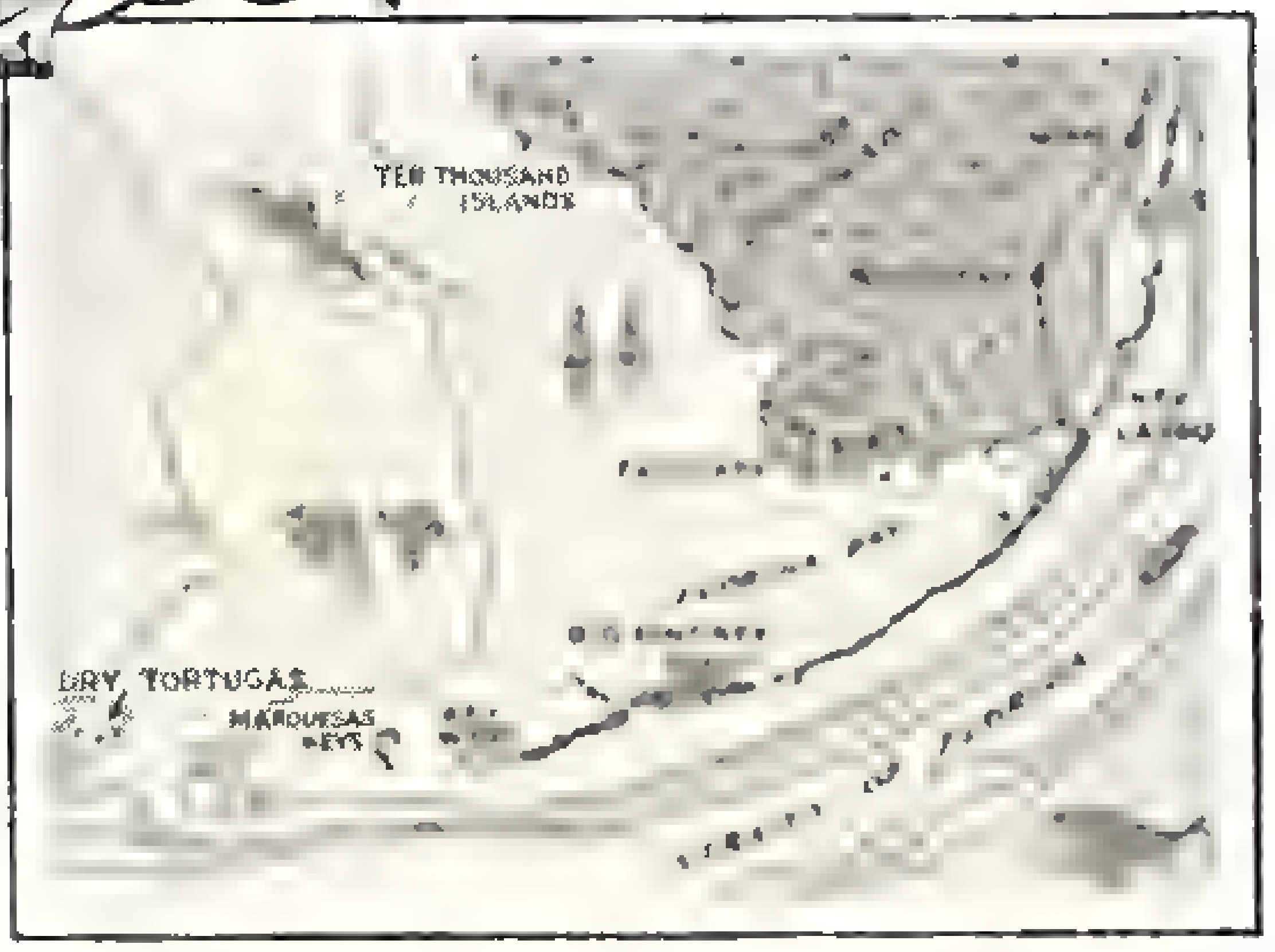
Bears are good fishermen. This Alaskan Brownie is spearing salmon from a stream. Brown bears, incidentally, aren't always brown—some of them are almost black in color. His temper is uncertain, no one being able to predict whether he'll charge a human being or turn tail and run.

FREAKISH DRAMAS of the OCEAN Bottom

by C. MORAN

Here Dr. Longley, head of the Tortugas biological station, prepares for a 55-ft. descent to sea bottom in 85-lb. diver's helmet. Undersea photos are taken with waterproof camera.

Here's a flashlight picture of a school of yellow goatfish and yellow grunts taken on sea bottom of Florida Keys.



Map of Florida Keys shows Dry Tortugas (extreme left), locale of extensive undersea exploration being conducted by Carnegie Institute Biological station under Dr. Longley.

THE tentacles of an octopus crept stealthily out from an overhanging ledge and seized its unwary prey.

A four-foot barracuda—"tiger of the sea"—with one lightning dart and a single quick snap of its powerful jaws cut a silver snapper in two.

The stalks, branches and blossoms of plant-like structures that swayed everywhere in profusion were in reality clever devices for catching, devouring, and assimilating living organisms.

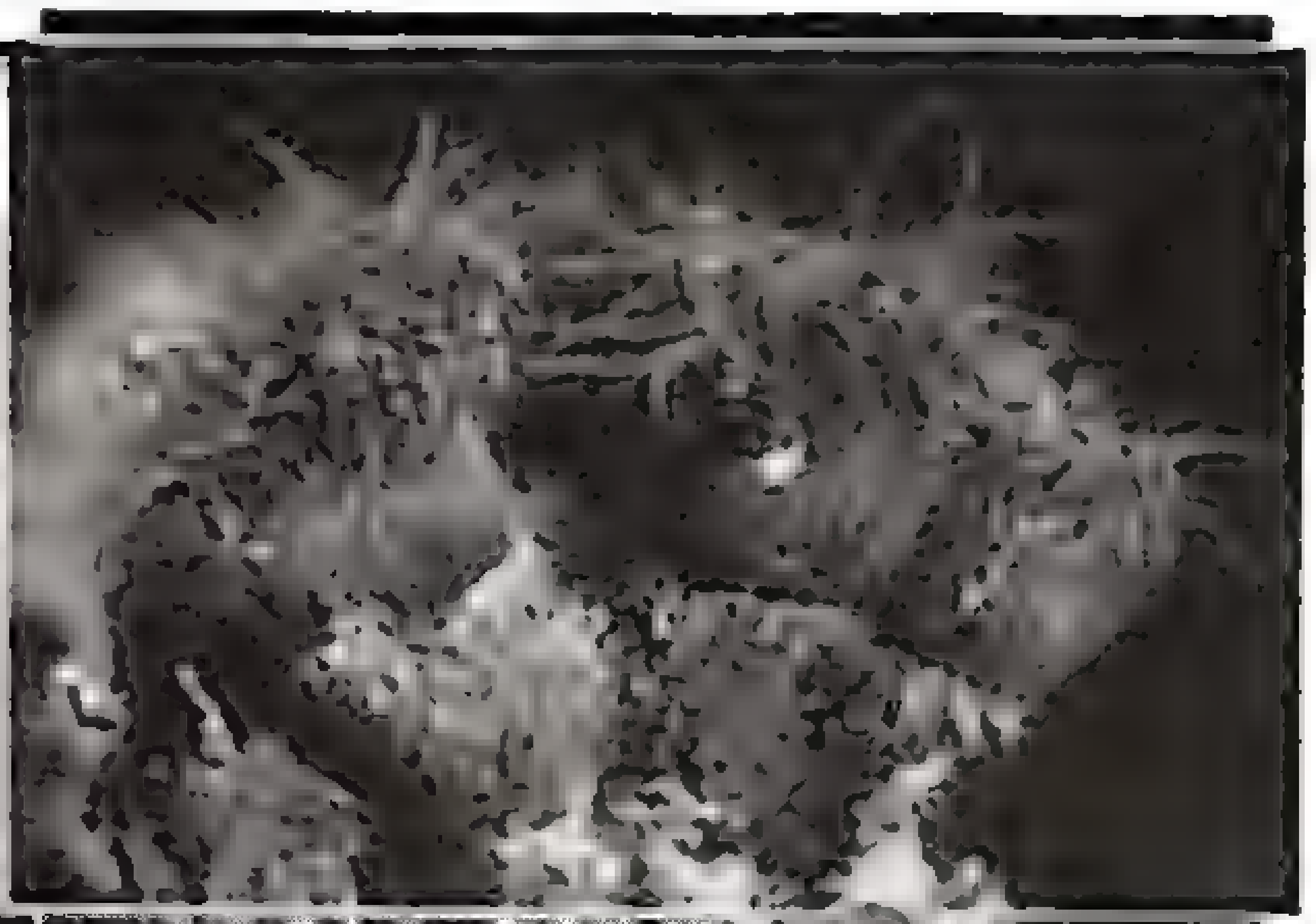
We watched this drama from a passageway on the bottom of the sea off Dry Tortugas Islands that mark the extreme western limit of the Florida Keys. The octopus paid no attention to us, if indeed he saw us at all, or possibly was repelled by our grotesque under-sea helmets and the tenuous air lines rising to the *Anton Dohrn* resting gently on the surface of the sea fifty feet overhead. The barracuda came near, nosed our garments, and slid away through the opalescent water.

We walked among the coral polyps and their cousins the anemones of every conceivable color—brown, violet, pink, white, yellow, purple, bright blue, vivid scarlet. Then my breath caught. All about us lay what appeared to be petrified human brains. I learned later that they were only "brain coral," whose skeletal support resembles the convolutions of the human brain.

Troops of fishes that have changeable color patterns darted about among the coral formations. My companion unslung his water-proof camera, and with the aid of an electric flashlight took a few photographs of schools of gray snappers, yellow goatfish, and yellow grunts.

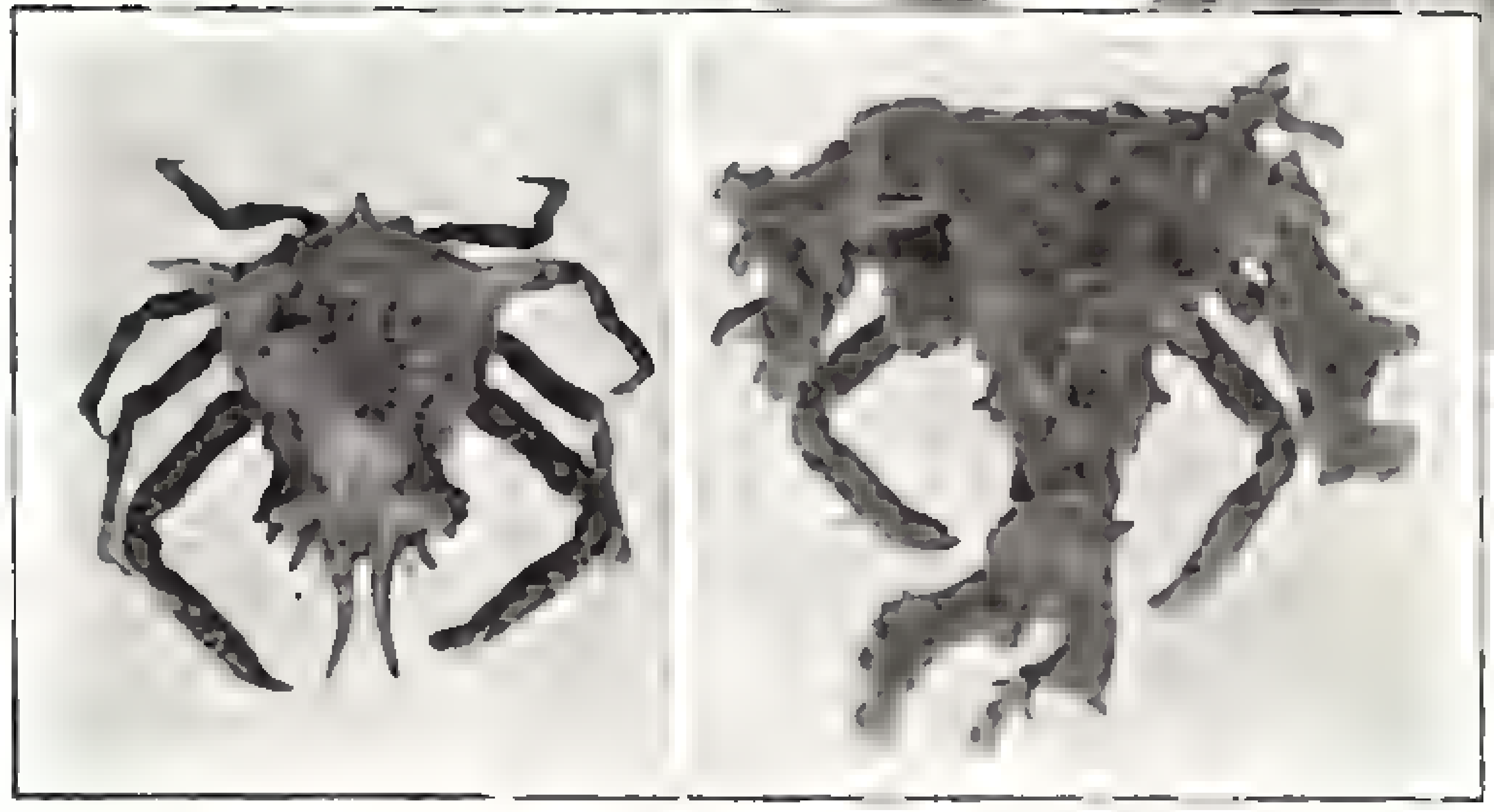
Dr. Longley, the scientist in charge of the marine biological station at Tortugas, has spent more than 3,000 hours in all on the bottom, watching and recording the ceaseless under-sea drama where the rule of the jungle, "kill or be killed," predominates, but where some extraordinary partnerships among widely different types of organisms have also been formed.

Remarkable undersea photo taken with flashlight bulb shows a school of gray snappers foraging for food.



A group of living coral polyps with fringe of tentacles on top for gathering food from the seawater.

Dr. Pearse, Duke University biologist, shown above as he sets out for day's exploration on bottom of sea.



Freak of the deep is Tortugas crab which conceals itself beneath a bit of sponge, which in short while takes root and grows on crab's shell. Offensive taste of the sponge protects crab against enemies. Photos show crab with and without sponge.

One of these partnerships is between a coral reef crab and certain anemones. The crab removes anemones from the rocks to which the latter adhere and carries them fully expanded in its first or clawed pair of legs. When the crab is attacked it defends itself by pushing the anemones toward the assailant; as the anemones, in turn, capture food, the crab transfers part of it to its own mouth.

There are crabs that tear bits of living sponge off the rocks and hold them on their own shells until the sponges take root and begin to grow. Thereby the crabs secure effective protection from their enemies, for the species of sponge which they thus utilize is distasteful to many creatures as it is packed with flinty, needle-like bodies and gives off a disagreeable odor.

There is a vividly colored fish, about an inch and a half long, that is always hovering about the giant sea-anemone. Upon the slightest alarm it darts for the anemone "blossom" and disappears among its feathery tentacles. When danger passes the finny occupant emerges from its protective cover. It is said that this fish is so dependent upon the anemone that it dies if the two are permanently separated.

Sucker fishes which attach themselves to larger fishes are common at Tortugas.

(Continued on page 145)

AT LAST—a Convertible AUTO-PLANE

by THEODORE A. HODGDON

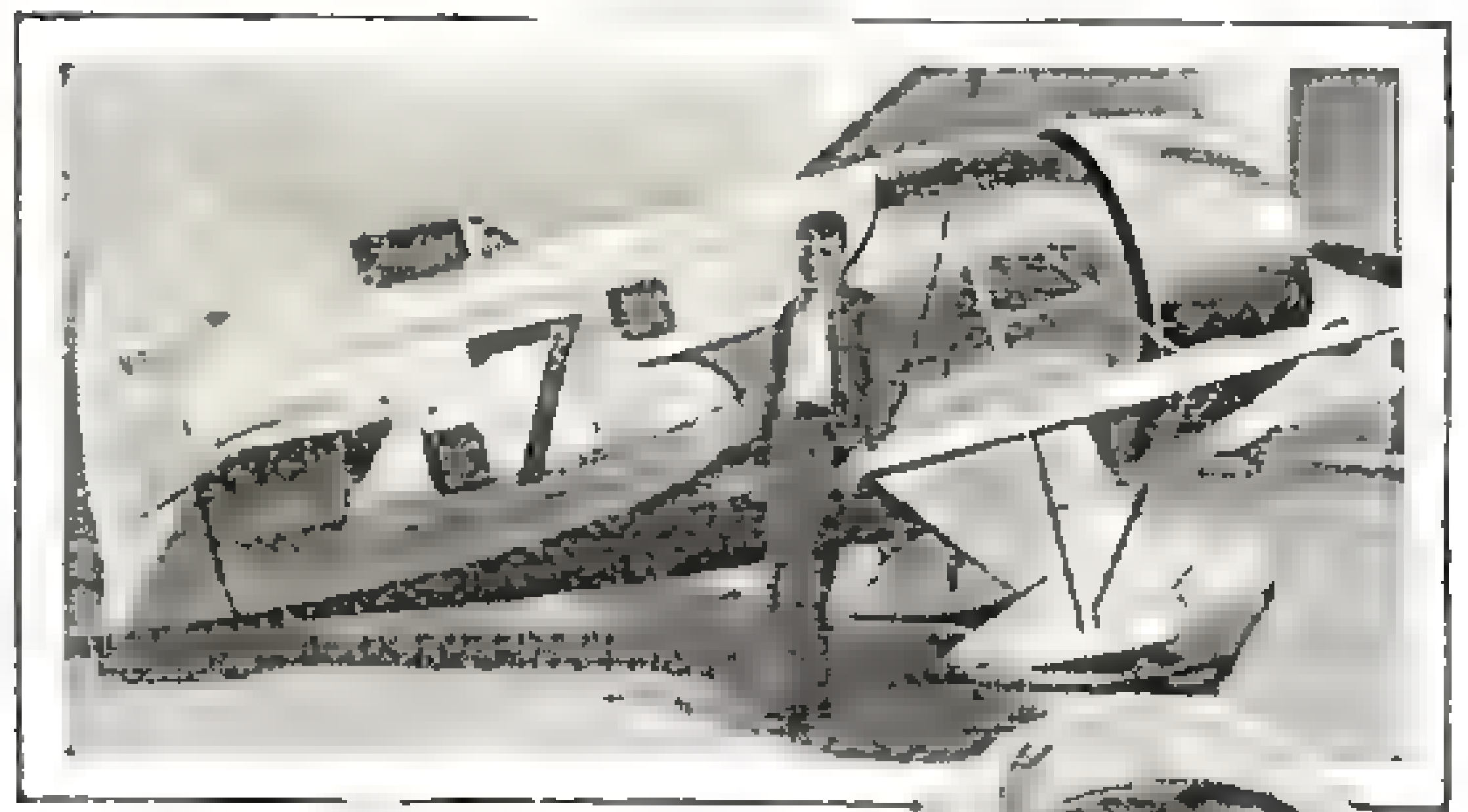
A STARTLING new vehicle which may be used in the air as a fast, sturdy airplane, and on the ground as a speedy, comfortable two-passenger coupe car, will shortly be available to aviation enthusiasts. The craft is really a streamlined mid-wing monoplane of 30-foot wing span, propelled by a 125-horsepower air cooled motor of regulation aircraft type. For ground use the ship may be quickly converted into a streamline car, simply by removing the wings and the rear end of the fuselage, leaving the closed cabin body resting on its three wheels, ready to drive through the streets. This transformation occupies about 20 minutes, by means of quickly detachable joints.

The development of the "Ascender," as the new ship is called, has taken many months of painstaking work in the selfsame Engineering Department which produced the fastest airplane in the world, Doolittle's "Flying Silo" which set a new world's record of 296 m.p.h. at the Cleveland air races last fall. The first Ascender has already been built and flown enough to prove itself a most unusual craft both in the air and on the ground.

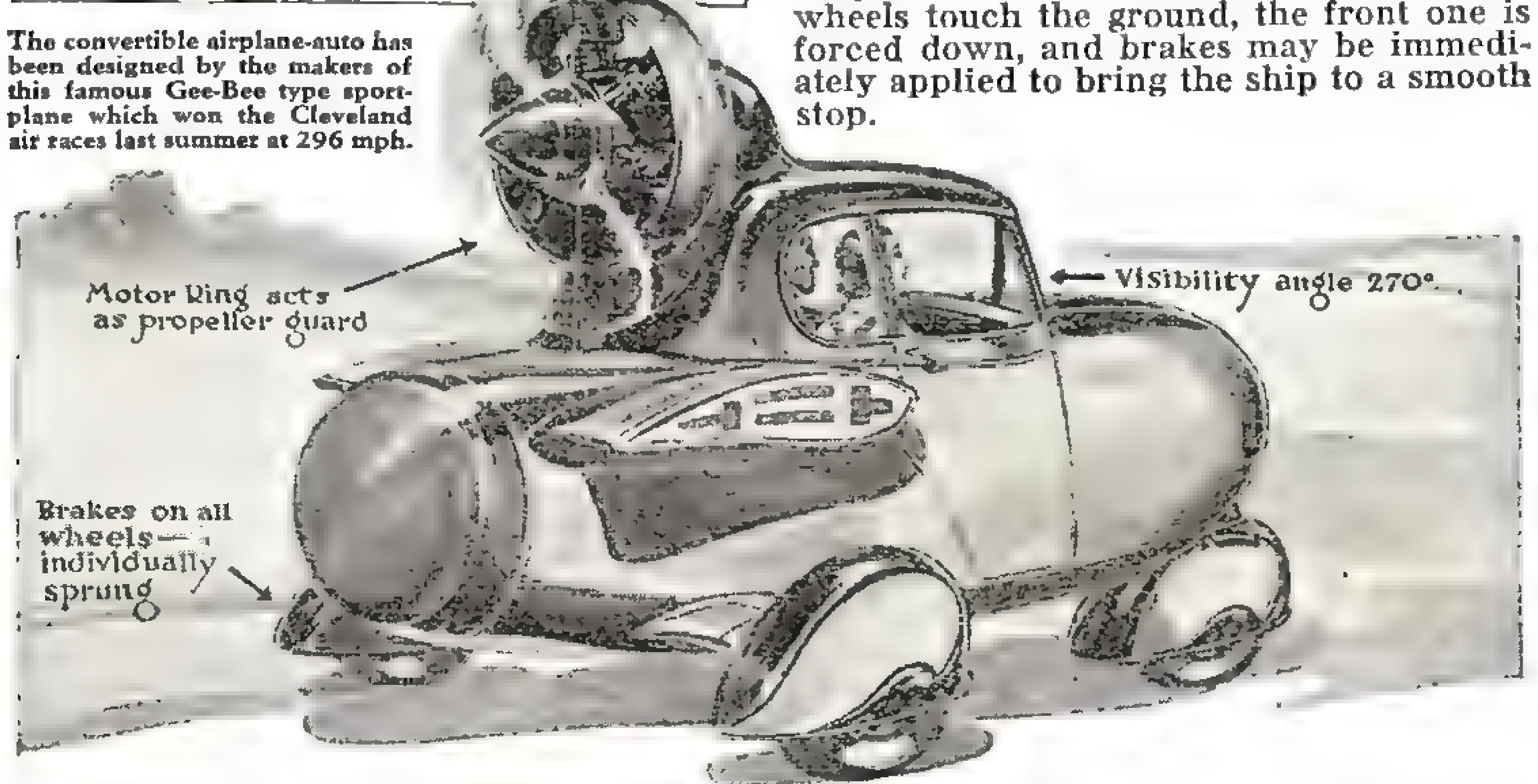
Control of this craft, in the air and on the ground, is by an automobile type steering wheel, a foot accelerator, and hand and foot operated brakes which act on all three wheels. While on the ground the ship rests on a three wheel landing gear, each wheel of which is equipped with internal brake and hydraulic shock absorber, as well as a large airwheel tire. The front wheel is steerable with the rudder of the ship, so that when the pilot moves the steering wheel to right or left, either on the ground or in the air, he guides the direction of his craft as he would a motor car.

On the takeoff there is no necessity of getting the tail up and balancing on two wheels while steering the ship down the runway by means of a rudder bar, as one is obliged to do in piloting the ordinary airplane. In this new craft, one merely sits behind the wheel, opens the throttle, and drives the ship down the field or runway as one would a car, with no possibility of "nosing over" even if brakes are applied suddenly, or from obstructions such as bumps, ditches, or soft spots. When sufficient speed has been attained the driver has merely to pull the wheel slightly toward him, whereupon the front wheel leaves the ground and the ship "takes the air."

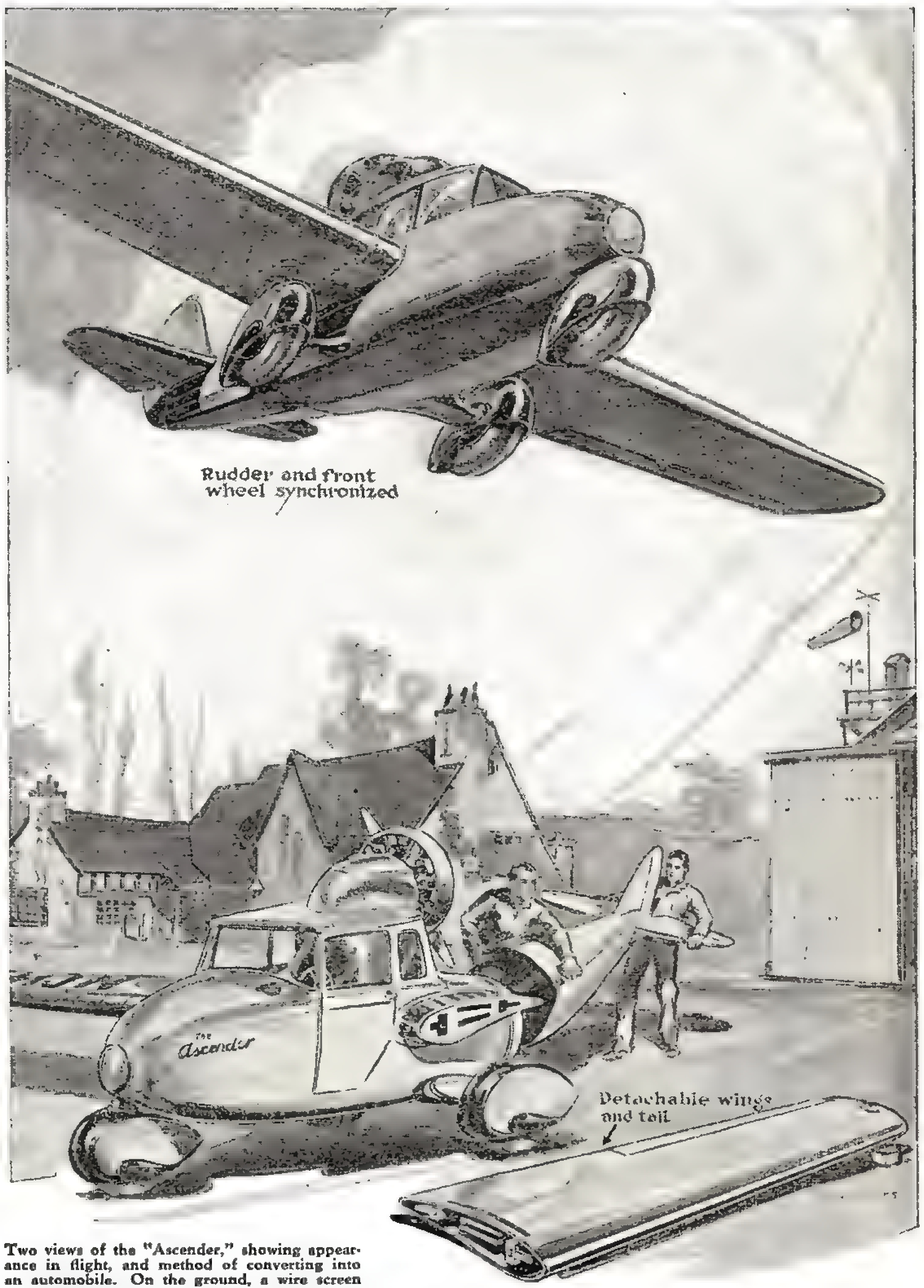
Landing the Ascender is a simpler task than in the ordinary airplane. It is no longer necessary for the pilot to judge his speed and distance so that the ship will stop flying directly over the spot in the field where he wishes to land. With this craft, he need merely throttle the engine, point the nose down until the ship assumes a normal glide toward the field and set the ship onto the ground at a speed much greater than is safely possible in the ordinary airplane. As soon as the two rear wheels touch the ground, the front one is forced down, and brakes may be immediately applied to bring the ship to a smooth stop.



The convertible airplane-auto has been designed by the makers of this famous Gee-Bee type sportplane which won the Cleveland air races last summer at 296 mph.


Motor Ring acts as propeller guard
Visibility angle 270°
Brakes on all wheels— individually sprung

The airplane is made ready for street use in 20 minutes by removing the wings and tail unit, easily detachable. Note the location of motor where it serves equally well for ground or air use. Angle of visibility is exceptionally broad.


Rudder and front wheel synchronized
The Ascender
Detachable wings and tail

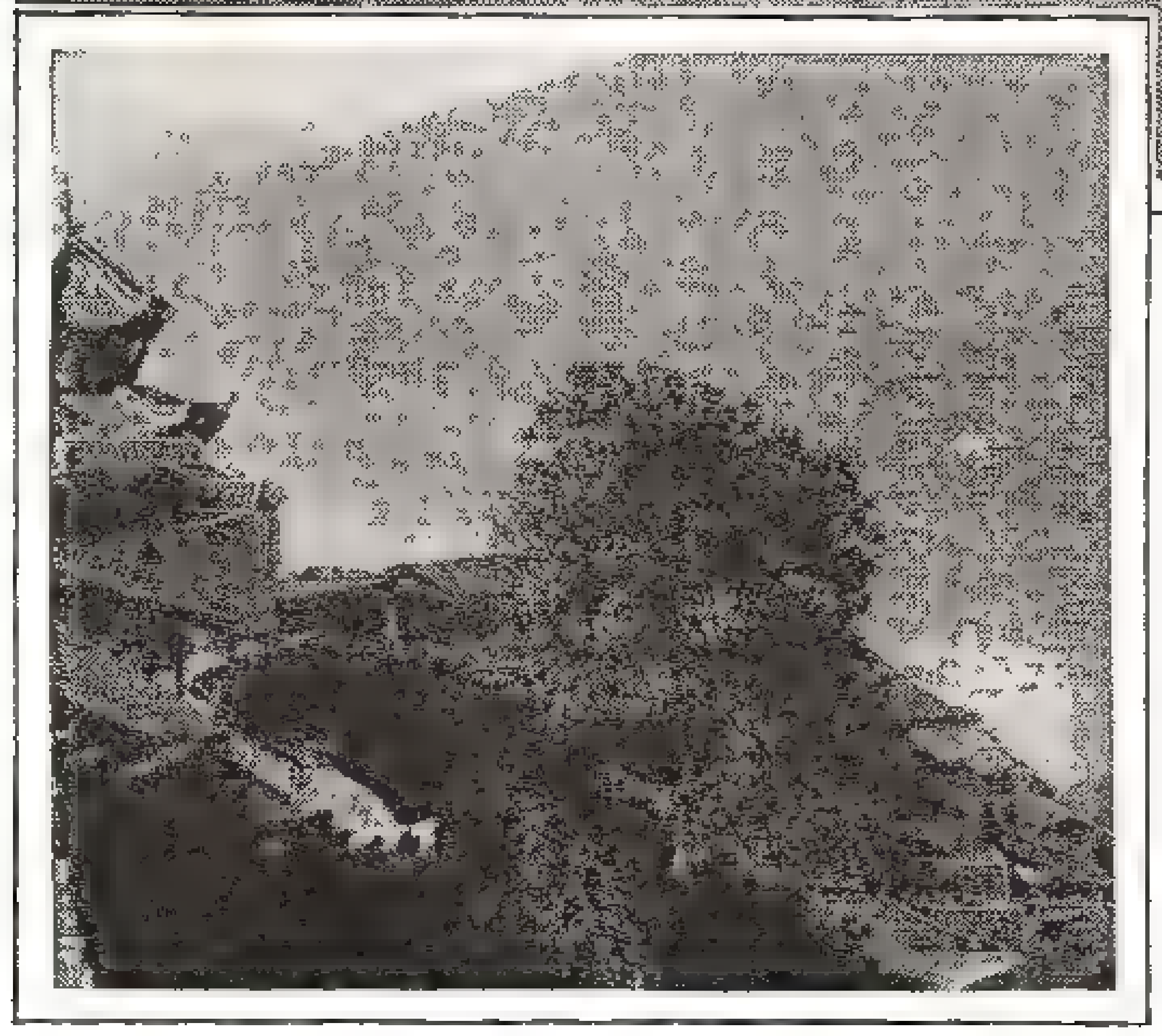
Two views of the "Ascender," showing appearance in flight, and method of converting into an automobile. On the ground, a wire screen is usually employed around the propeller as a safeguard, though the arc of the blade is well within the confines of the car.

Fighting Chinese Pirates with U. S. Marines

by JOHN CLOVELLY

Seven Yankee gunboats, patrolling the Yangtze river in conjunction with those of other nations, wage constant war against the bandits who infest this district which boasts one-third of the world's population. Little known activities of this romantic branch of the foreign service are described in this article.

The beginning of the tremendous gorges of the Yangtze—noted for their dangers because of the swift rise and fall of the waters. A French gunboat was once left stranded 24-ft. above the river when waters fell that distance in a day.



Looking down on the mighty Yanztze, 1500 miles upstream from Nanking. The prow of a British gunboat is seen in the foreground. The patrol is carried into the rich province of Szechwan, which has three-fourths the population of the United States.

WHILE riding through an almost endless succession of dangerous rapids, whirlpools and currents in the Yangtze River, about 160 miles above Hankow, a merchant vessel operated by an American, named Captain Baker, suddenly went aground. It was night-time and a stone's throw away could be dimly seen the craggy outlines of the shore.

Nine times out of ten such an accident results in a bandit attack in this remote section of China. But hardly had the American given the order to his Chinese crew to arm themselves when things began to happen. Not a single warning sound was heard and yet, within five minutes' time, every coolie had been disarmed and bound by as villainous a gang of cutthroats as Baker had ever seen. Armed with sawed-off shotguns and wearing filthy rags, they looked as if they would commit murder for a dollar.

However, their leader calmly announced that he would release the American upon receipt of two million dollars! Of course he did not make good on this fantastic demand, but his thugs seized Baker's boat containing perhaps $10,000 worth of cargo, and kept him prisoner for three months. At which time, thanks to friends, Baker raised a couple of thousand dollars and was freed.

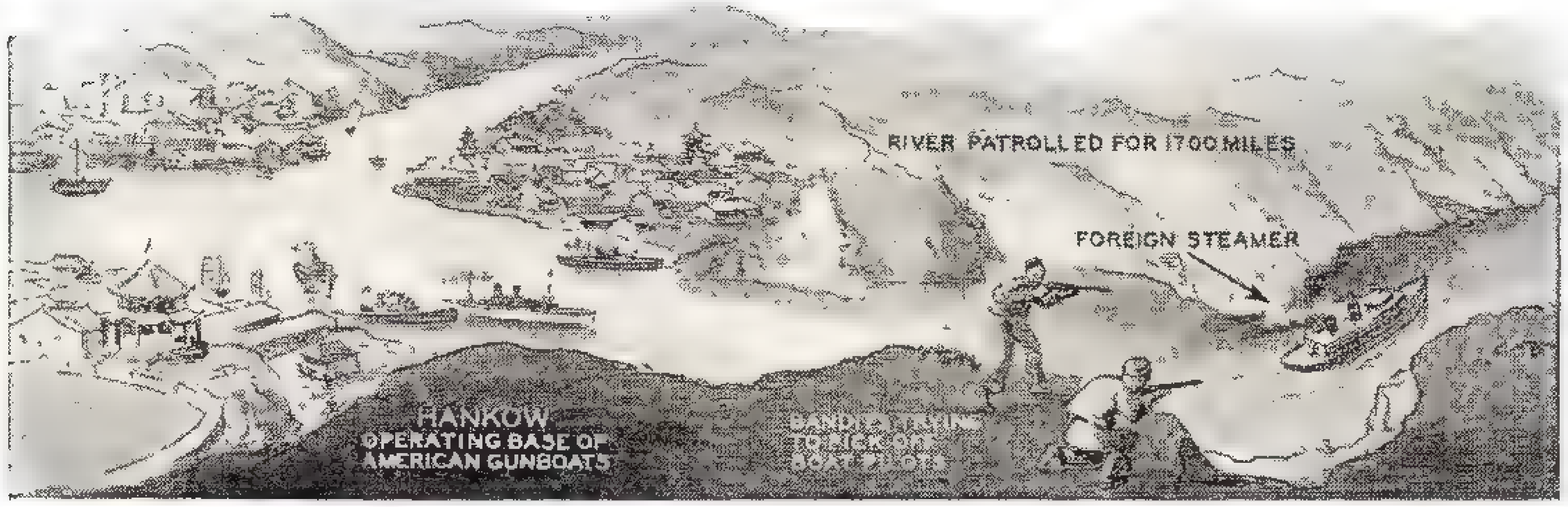
Such instances happen again and again in the region of China's mightiest river, which rises in the snow-capped mountains of Tibet and winds its way irregularly in a generally seaward direction for nearly three thousands miles to the ocean, emptying into the Yellow Sea a few miles from Shanghai.

Small wonder, what with trade transactions such a tremendous gamble and human life a thing to be sneered at, that the gunboats of our Navy, Great Britain, France, Italy and Japan, regularly patrol the length of the Yangtze for nearly 1,700 miles, a distance as great as that from the mouth of the Mississippi to Hudson Bay, Canada.

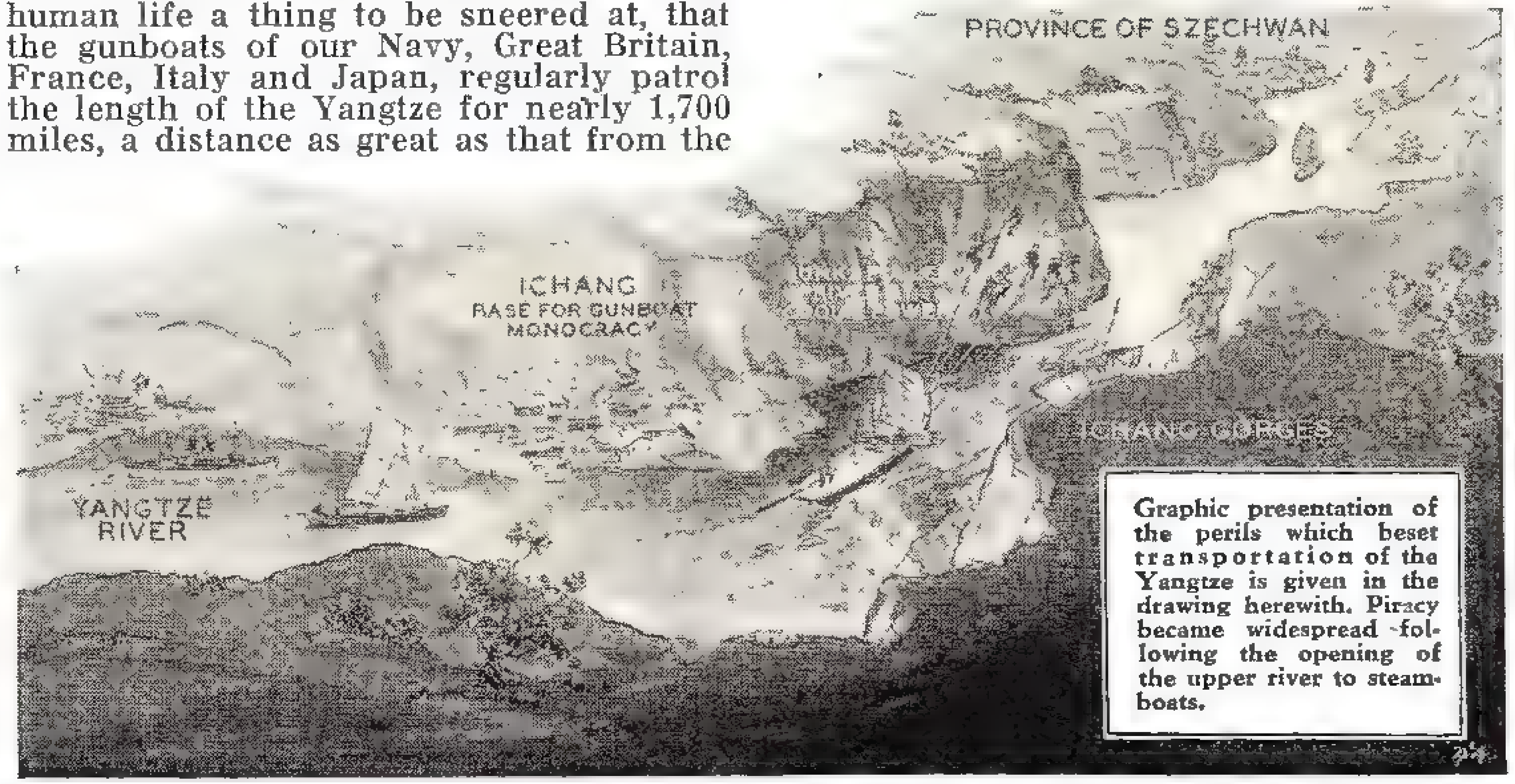
U. S. tar watching a junk suspected of being one of a pirate group. Construction of the junk is typical; sails are of bamboo matting. Note the control ropes of the sail.

The American patrol force consists of seven regular gunboats and, according to the seriousness of the emergency, any one of four "spare" gunboats. Each vessel carries three to four ship's officers, one doctor, and a crew of about 50 enlisted men. The boats are distributed throughout the Yangtze region as follows:

At Hankow, 600 miles up the river, is the regular operations base for the *Luzon,*



RIVER PATROLLED FOR 1700 MILES
FOREIGN STEAMER
HANKOW
OPERATING BASE OF AMERICAN GUNBOATS
BANDITS TRYING TO PICK OFF BOAT PILOTS



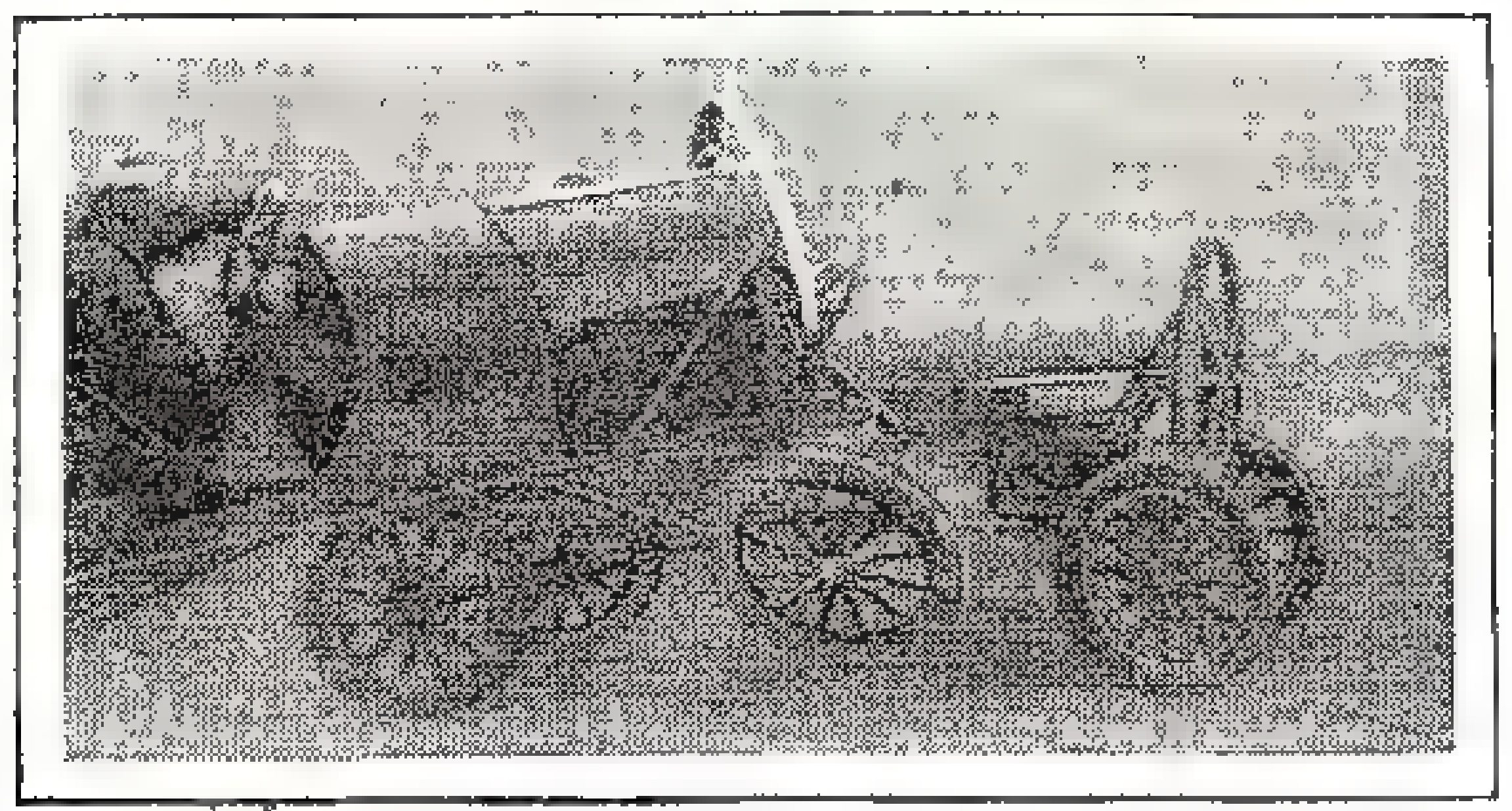
Graphic presentation of the perils which beset transportation of the Yangtze is given in the drawing herewith. Piracy became widespread following the opening of the upper river to steamboats.

New THRILLS from Freak SPILLS of AUTO BALL

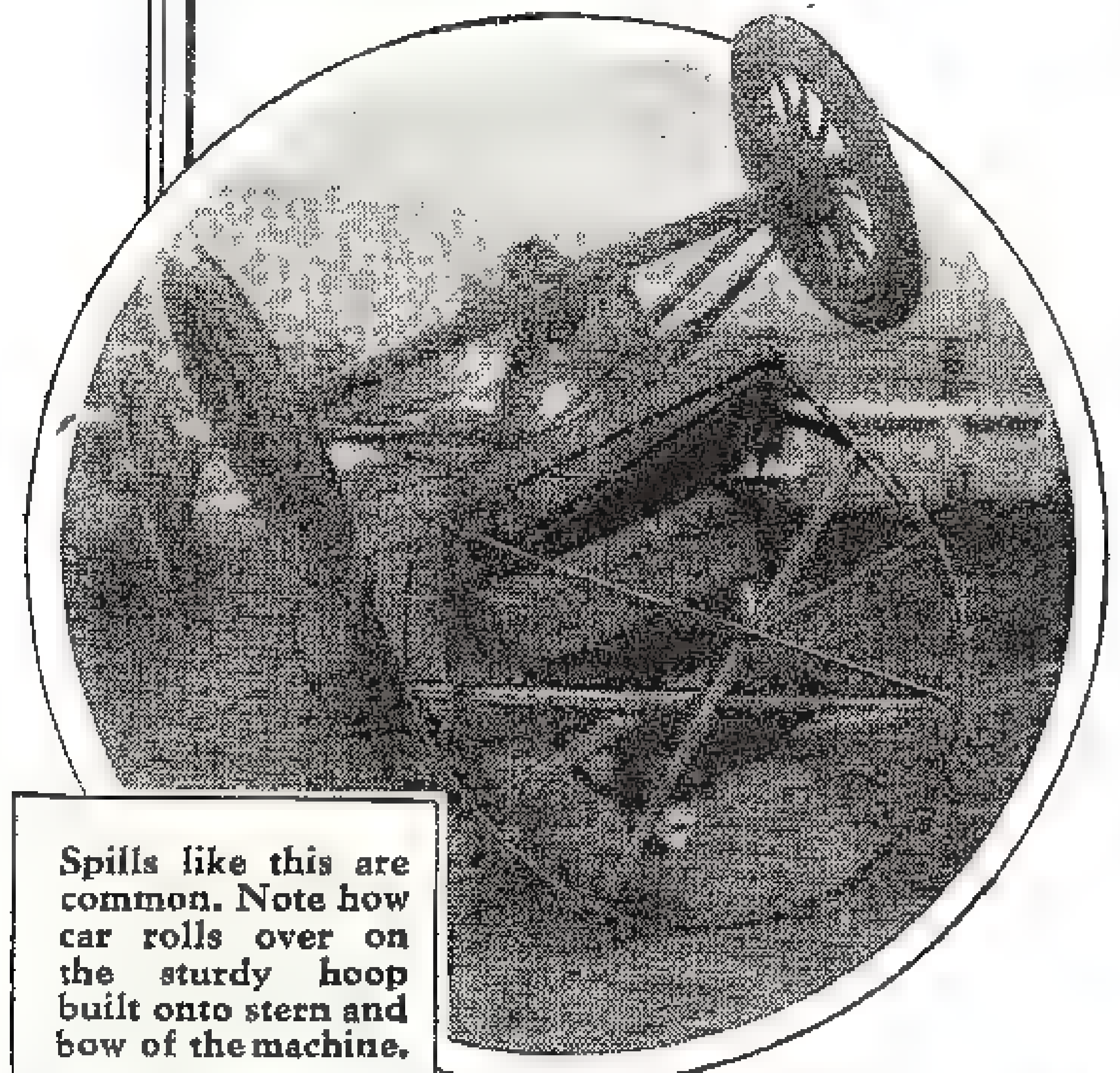
by ED HARLAN GIBSON

SPILLS! Thrills! Smashups! Constant danger. Daredevil drivers strapped in odd looking, speeding cars, bouncing a huge ball about the race track.

Spills? Sure there's one! Dust clouds rise as a little car does a crashing "barrel-roll." Then another, farther up the track, fairly leaps into space as it turns over. The air about the grandstand has the tainted odor of burning rubber from spinning wheels—wheels spinning first back and then forward. Cars skid, slide about, swap ends like a wild bucking broncho.



Spectators at auto ball games are treated to all manner of freak accidents. Here a machine is seen climbing an opponent in furious clash.



Spills like this are common. Note how car rolls over on the sturdy hoop built onto stern and bow of the machine.

Another crash. A breath-taking spill. Wheels smash to splinters. For an instant the driver is hidden from the spectators' view.

The driver! He's killed? Smashed? No! There he is under the car, hanging in his safety belt with 1,600 pounds of iron and steel above him.

Those who are near can smell spilled gasoline. An oil spattered face smiles out at the spectators. Maybe he is bruised and injured, but still the driver smiles. It's a game he is playing and he loves the dangers it involves.

Game of Hairbreadth Escapes

The roaring motor now above him is barking out a sharp, angry exhaust. The smell of gasoline becomes stronger. From his upside-down position the driver can watch the gasoline drip uncomfortably close to the red-hot manifold. Just a few drops landing directly upon it and instantly flames will be lapping at his feet, scorching his hands and face. In the nick of time attendants tip the car back upon its wheels.

The game goes on. More spills and hairbreadth escapes. Contenders fighting with cars for scores and, above all, aiming to give their spectators a thrill. A startling novelty; better than auto racing.

It is the Gibson troupe in action. The game is auto ball. The place? Any county or state fair that has contracted with the players to give their public a really thrilling attraction—a novelty that is different.

There are six specially built cars in the outfit. Four are used in each game, leaving two in reserve to use when wheels or other parts are broken. The object of the game is similar to that of football. One team endeavors to push the large ball through the opposite goal and, above all, to give the spectators unusual entertainment while doing so.

The ball used is also especially made. It is four feet high when inflated. Six plys of rubber and fabric are used in its construction which resembles that of an automobile tire. It weighs approximately seventy-five pounds. Many times these cars, weighing close to sixteen hundred pounds, are driven completely over the top of the ball without puncturing it. Again it is bounced ten to twenty feet into the air and well over the opponent's car. This is called a kickoff.

In the course of a game accidents are constantly expected and taken merely as a matter of course. The large ball, sailing through the air, has often caught a driver unawares, knocking him completely unconscious. Again, striking the steering wheel, the ball has smashed it between the hands of the driver.

Fire Most Deadly Menace

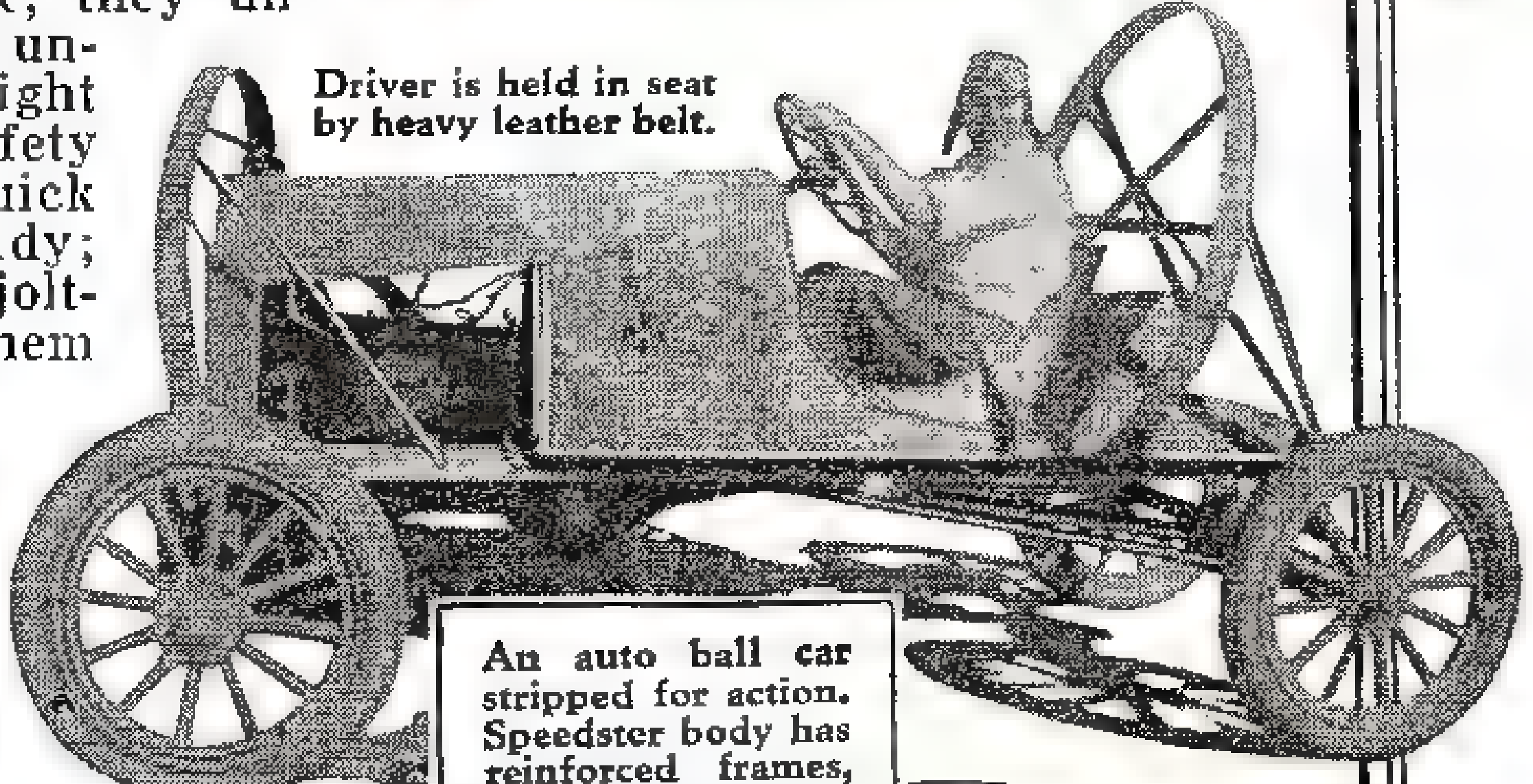
Fire is another hazard to contend with. Running wide open, the motors soon become red-hot. Then just a few drops of gasoline falling from the carburetor onto the red-hot manifold, while the car is upside down, will instantly ignite it. Breathless moments follow.

The attendant's first thought is of the driver. With flames already spreading about the oil-covered machine, they unstrap him. This he cannot do unassisted because of his weight hanging in the belt. Airplane safety belts have been tried. The quick way of hooking them was handy; too handy, for the jarring and jolting of the body unhooked them during the game.

Fire in a night game is a spectacular sight and women in the grandstand have even fainted watching the flames enveloping the car. Thus far the driver has been removed invariably unharmed in all cases.

Experience has taught the drivers the knack of keeping their motors running in all positions, be it upside down or how. These drivers in auto ball claim a record of their own for spills, which in sport parlance means the complete overturning of the cars. In a short game of five minutes of play as many as fifteen spills have been made.

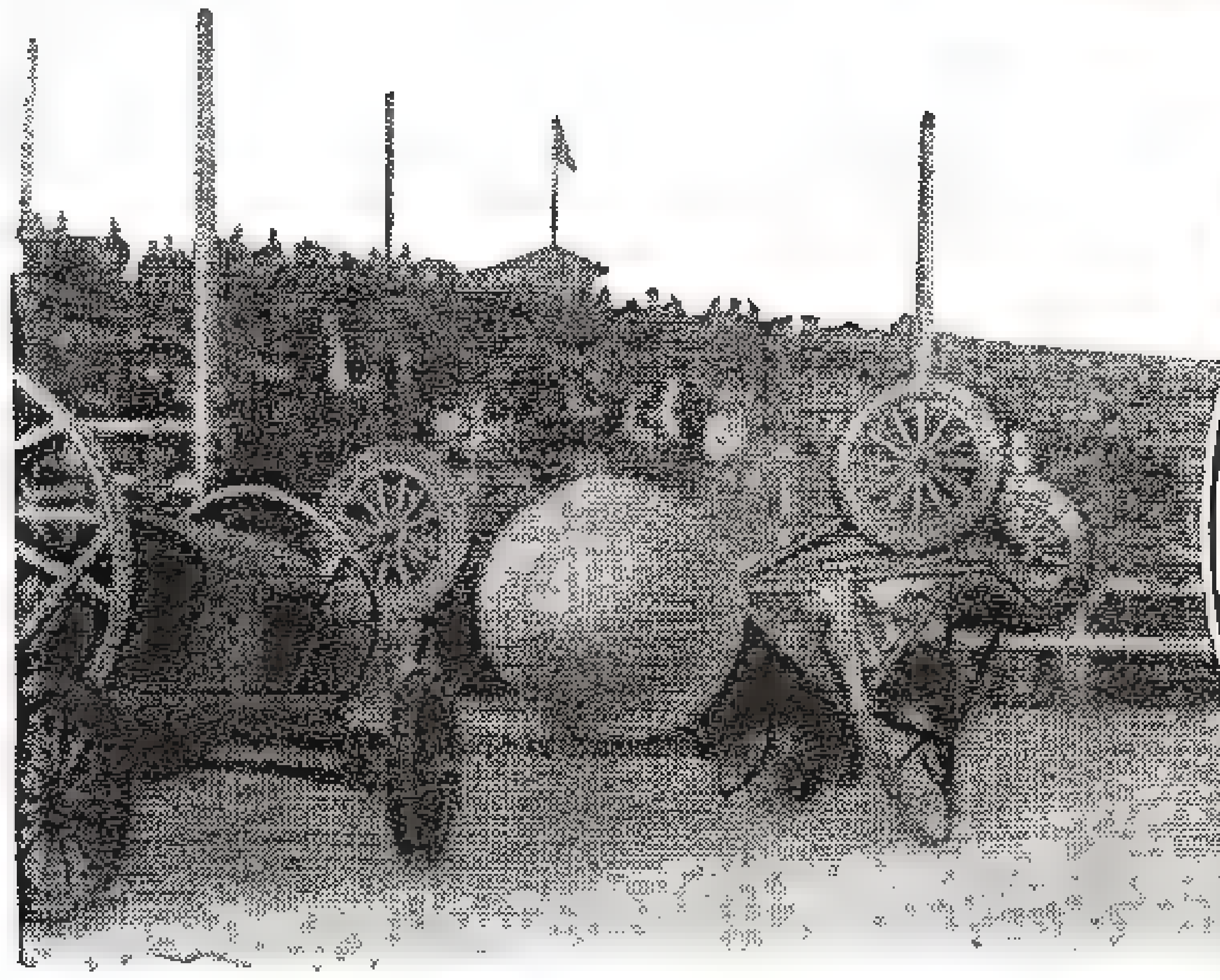
This is action in the raw. The grandstand reaction is deafening applause as only a thrill loving satisfied crowd can give.



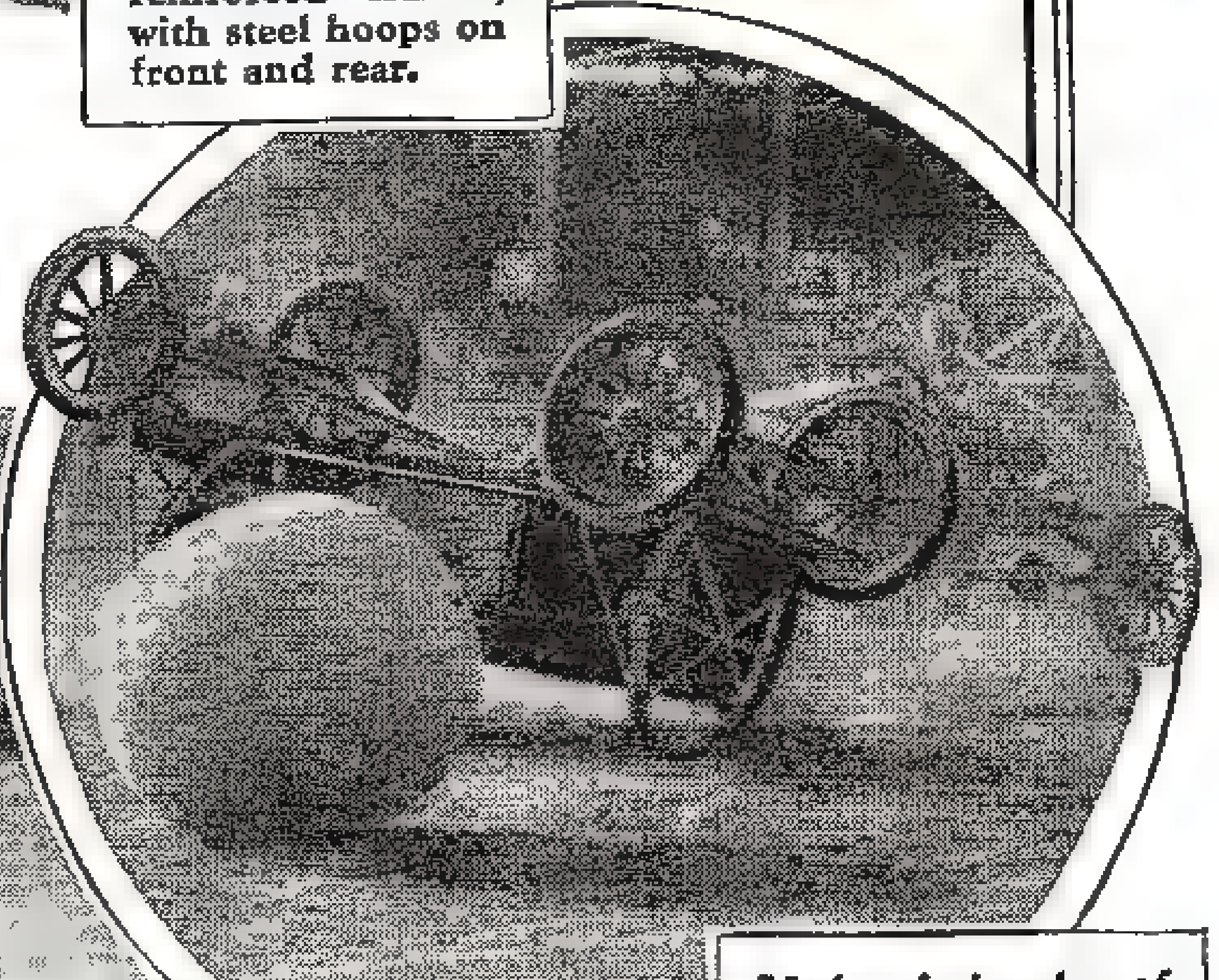
Driver is held in seat by heavy leather belt.

An auto ball car stripped for action. Speedster body has reinforced frames, with steel hoops on front and rear.

In the heat of the battle. Two machines pursuing the ball have just clashed, resulting in a spill for both. In the Auto Ball games, which are staged by intrepid drivers at country fairs, four cars specially built to withstand heavy punishment, take part, two machines being held on sidelines for emergency use. Object of the game is similar to football.



Typical action shot here shows one contestant doing a "barrel roll," while opponent maneuvers into position to give the ball a sock towards his goal. When in upside down position, driver's life is greatly endangered by gas dripping on overheated manifold. The motor is kept running always.



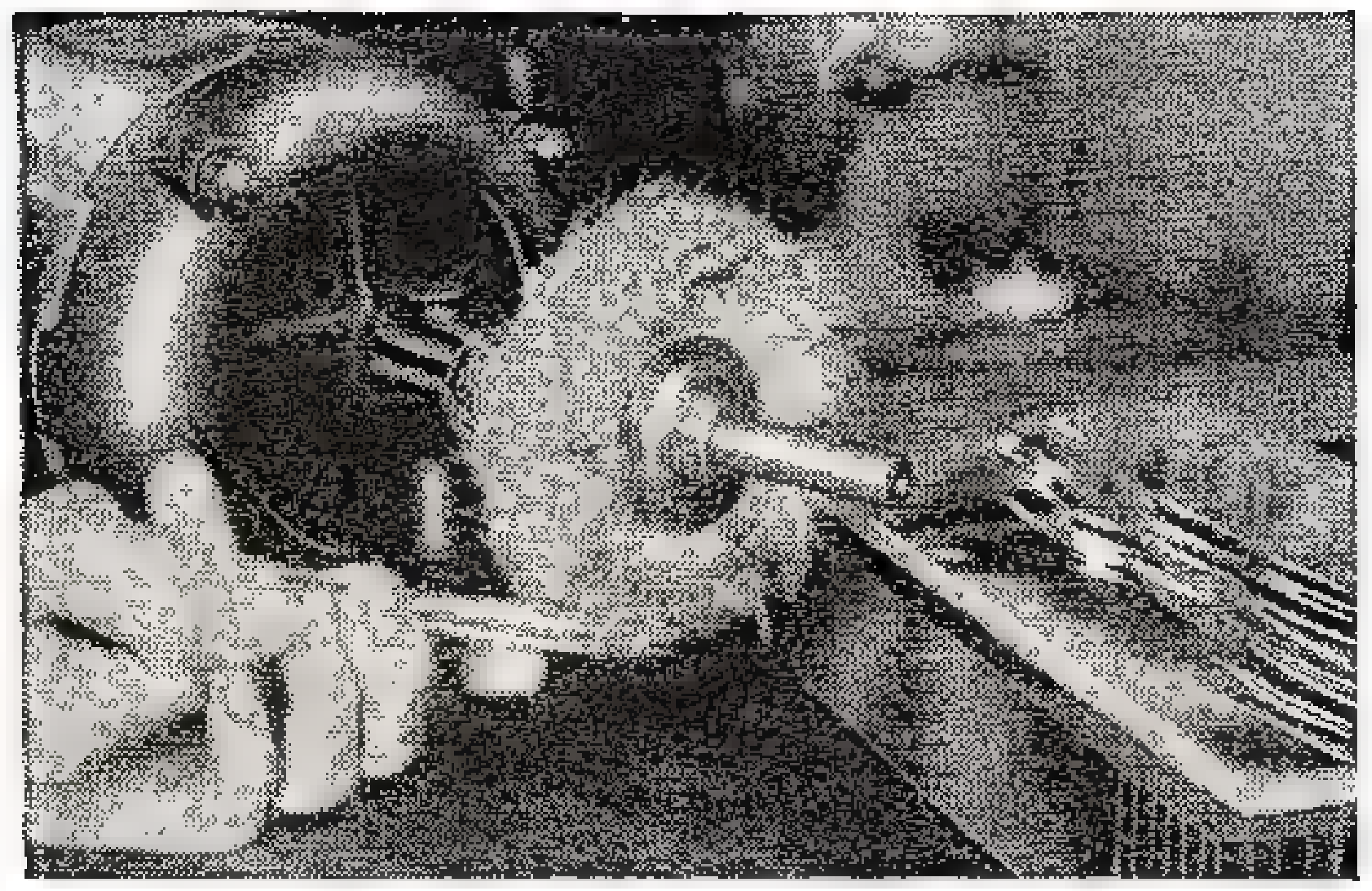
Made of six plys of rubber and fabric, the ball is four feet in diameter, weighing 75 pounds inflated.

1000 WAYS to MAKE a LIVING

Continuing the presentation of a series of articles on money-making ideas which have been proved out in practice.

Silverware Rebuffing

Regardless of how careful the housewife is, her silverware will gradually become scratched. The fellow in the neighborhood with a small buffing outfit and a stick of plater's rouge can be of great help and earn himself a dollar or two at the same time. Such ware does not need to be re-plated. As a matter of fact, re-plating will not remove the scratches—only buffing will do that. One man who makes upwards of $5 a day in this way, solicits business on a piecework basis, charging three cents each for knives and forks, more for pitchers and plates. He finds that much of his business comes from word of mouth advertising of those pleased with his work.



The only way to restore scratched silverware to new condition is to re-buff it with the equipment shown above.

Empty Store Windows

A young Canadian is making a nice living out of empty stores! He lives in a suburban district of some 100 stores, a dozen or more of which are vacant. He acts as agent for the rental of those vacant store windows, finding that the landlords are invariably glad to accept any small sum in the way of revenue. Users of billboard space are good prospects for the rental of windows for displays; public utility companies, tobacco manufacturers, and owners of adjacent stores who wish to extend their display space, are also good customers. The young man keeps the windows clean, charging a monthly rental, and picks up additional income from setting up displays and doing the window trimming.

Conducting a Doll "Hospital"

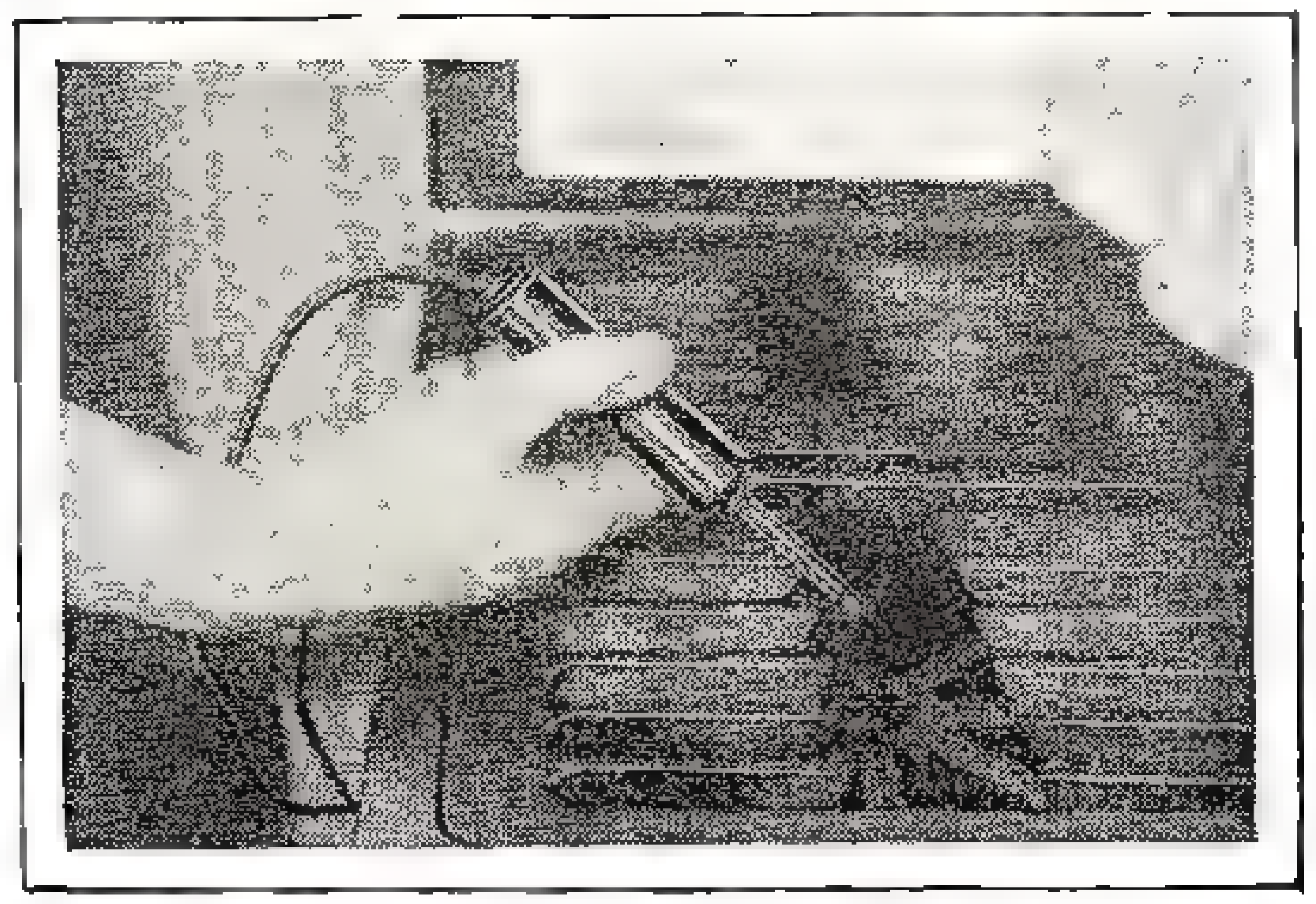
For more than seven years an elderly woman has kept young and made a living as a specialist in repairing worn or broken dolls. Such handicraft as might be used in mending pottery, painting china, arranging hair and sewing dresses makes up the unique qualification of the doll doctor. Charges are based on the time and material required on each "case." The testimony of a customer that "our doll means more to my little girl than you could imagine" reminds one that business built on simple sentiment is none the less real business. One factor that makes many sales is that the human hair of any member of a family can be made into a doll wig and thus kept as a souvenir of sentiment. The doll hospital is also an agency for the sale of new dolls.

New Income for Radio Men

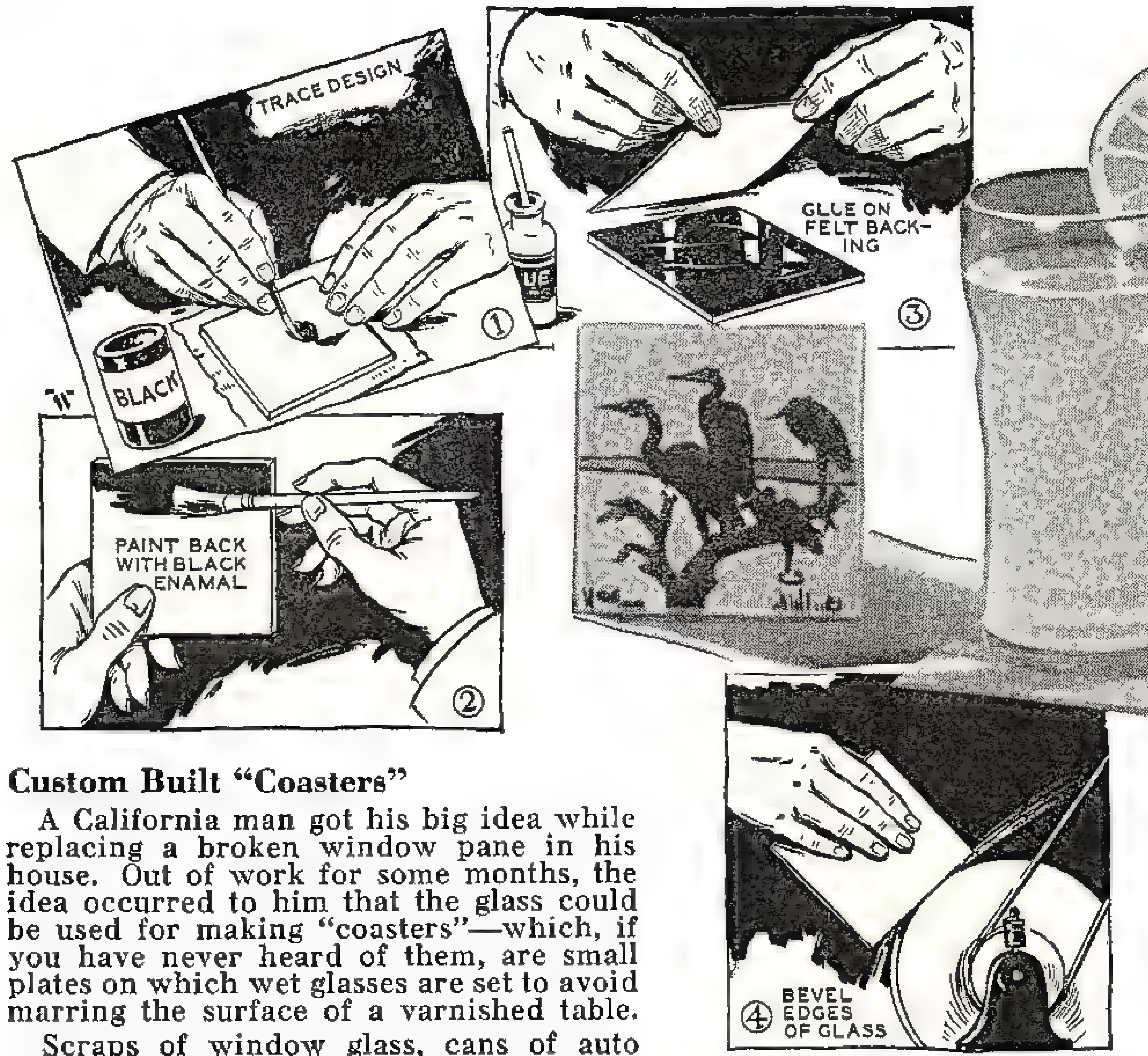
Thousands of readers of this magazine are rather proficient in radio and could very well profit by the experience of a young Buffalo, N. Y. repairman who, with things so quiet recently, got several big contracts from the larger music teachers of the town. He thought it would be a fine idea if he sold those teachers of voice culture a recording outfit so that their pupils could correct their mistakes by listening to their own voices. After each lesson the pupil could sing a number that would be recorded and then take the small, inexpensive record home to let the family hear it. Other teachers flocked to have similar systems installed and several thousand dollars worth of business was developed within a few months. It was the type of installation that could be handled by any good radio experimenter.

Electric Gas Stove Lighters

If a chap wants to go to some of the automobile junk yards today he will find that he will be able to buy all of the old Ford ignition coils that he can carry home for ten cents apiece. With two dry cells (of the small type that may now be purchased in the chain stores for ten cents apiece) these old coils make an excellent source of high potential for lighting gas stoves. The only other thing that is needed is a high potential electrode that can easily be made in the home shop. We still have in use many thousands of gas stoves that have to be lighted by matches and each user of such a stove is a good prospect for such an installation that may be made very profitably for about two dollars.



An electric gas stove lighter, operated by Ford ignition coil and dry cells, is welcomed by many housewives.



Steps in making coasters: Silhouette design is traced, colors applied, coat of enamel painted on, felt glued to back, and edges beveled off.

Custom Built "Coasters"

A California man got his big idea while replacing a broken window pane in his house. Out of work for some months, the idea occurred to him that the glass could be used for making "coasters"—which, if you have never heard of them, are small plates on which wet glasses are set to avoid marring the surface of a varnished table.

Scraps of window glass, cans of auto enamel, a glass cutter, brushes, sand stone and felt are all the equipment required. The steps of manufacture are well shown in the illustration above. Any magazine drawing which lends itself well to silhouette can be used. The outline is painted in black enamel, and after it is dry colored backgrounds painted over it. Felt or velvet is then glued to the base to prevent scratching furniture, and the edges of the glass beveled off on a small grinding wheel. The originator of this idea finds that he can secure enough orders in one day's solicitation to keep his factory busy for a week. Glass can be salvaged from broken panes.

Neighborhood Small Stock Butcher

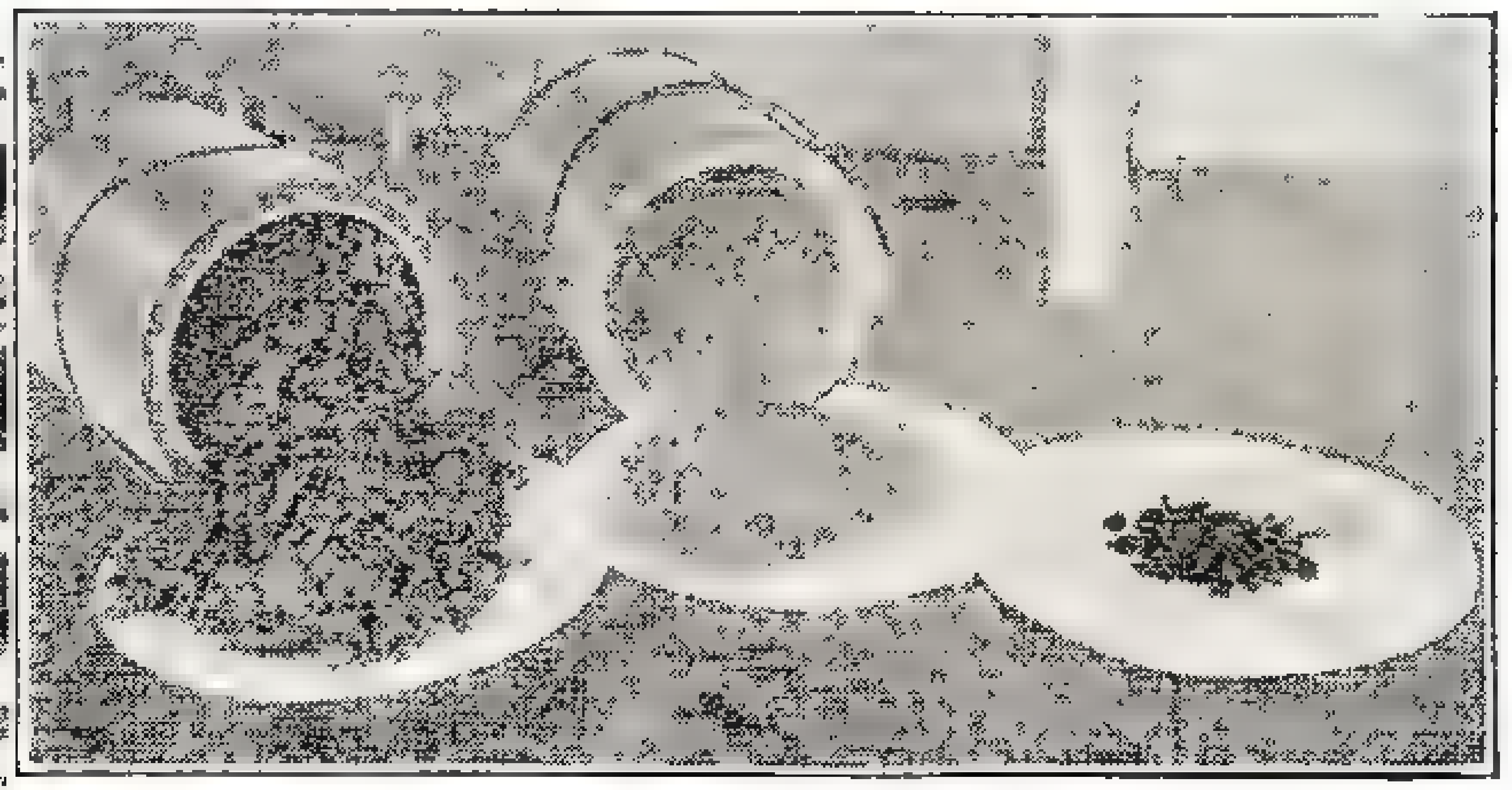
An unemployed man, seeking to "earn his eats" by odd jobs around produce markets and grocery stores, discovered the need for a small stock butcher at these places. The dealers, preoccupied by the many details of the day's business, are glad to turn over the task of dressing poultry and rabbits to this man. With only slight experience on farm and game fields he soon became rapid and skillful in dressing these meats to the satisfaction of the customers. The larger part of the difference in price between live stock purchases and dressed meat purchases goes to him as his fee. There are two side-lines to this job that bring additional profits: making quick deliveries for the dealers, and killing and dressing poultry for housewives who find such a task far from their liking. Now the new specialty butcher serves three dealers; he is pulling through the dark days with a moderate livelihood and he is laying the foundation for his own poultry and rabbit market that he has planned to start.

Spring Housecleaning Opportunities

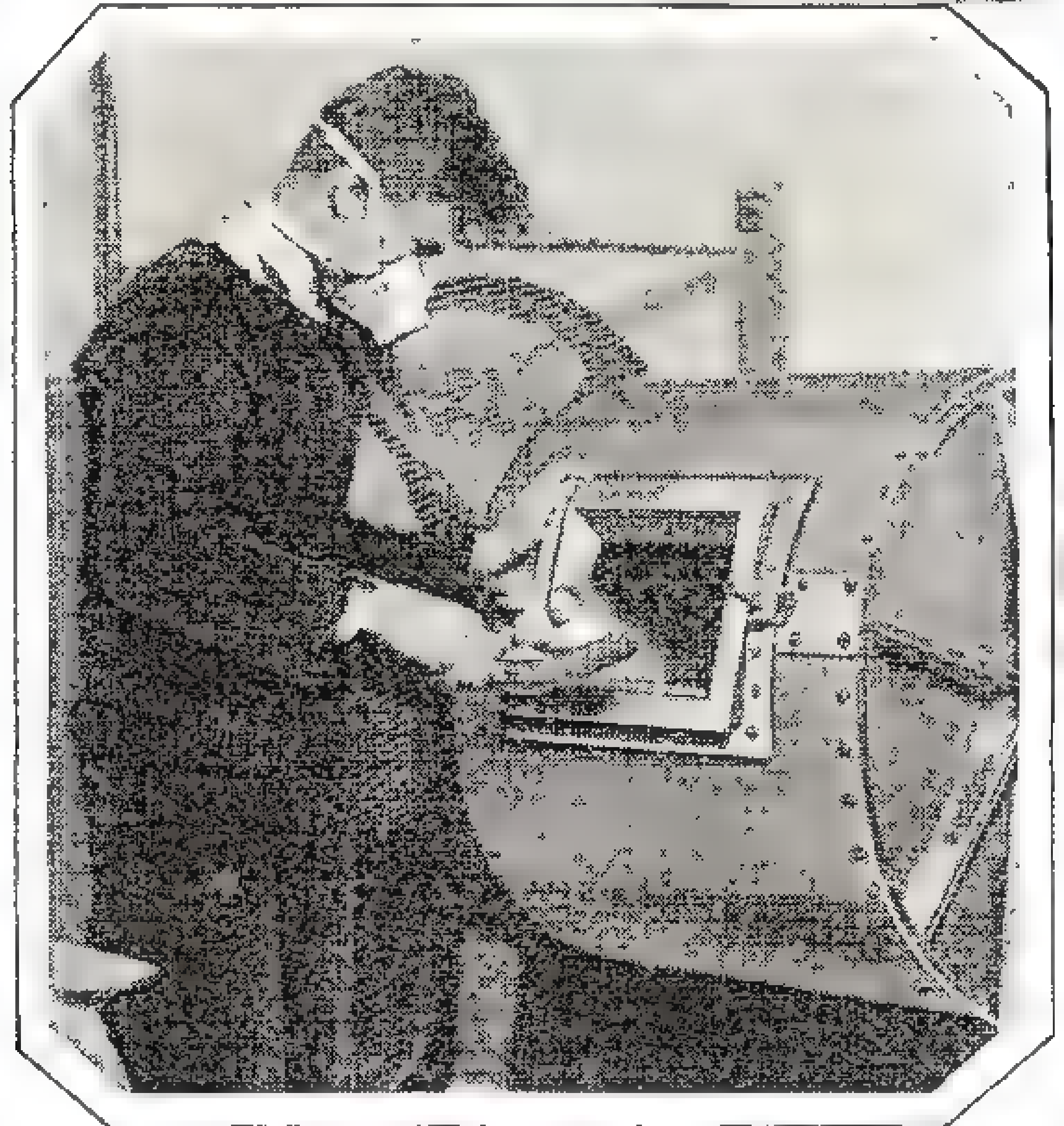
With the spring season for housecleaning under way, the man who has a few pieces of household equipment which he can throw into his car will find his services welcomed by many housewives. A vacuum cleaner with attachments for cleaning mattresses, mouldings and baseboards, a carpet beater to accommodate the woman who still prefers to have her rugs taken outdoors and beaten, a chamois and window cleaning materials, floor waxer and polisher and a good furniture polish, will bring many an hour's work.

Plants GROW "BLOOD" for HUMAN HEALTH

First step in production of chlorophyll is drying of leaves in oven.

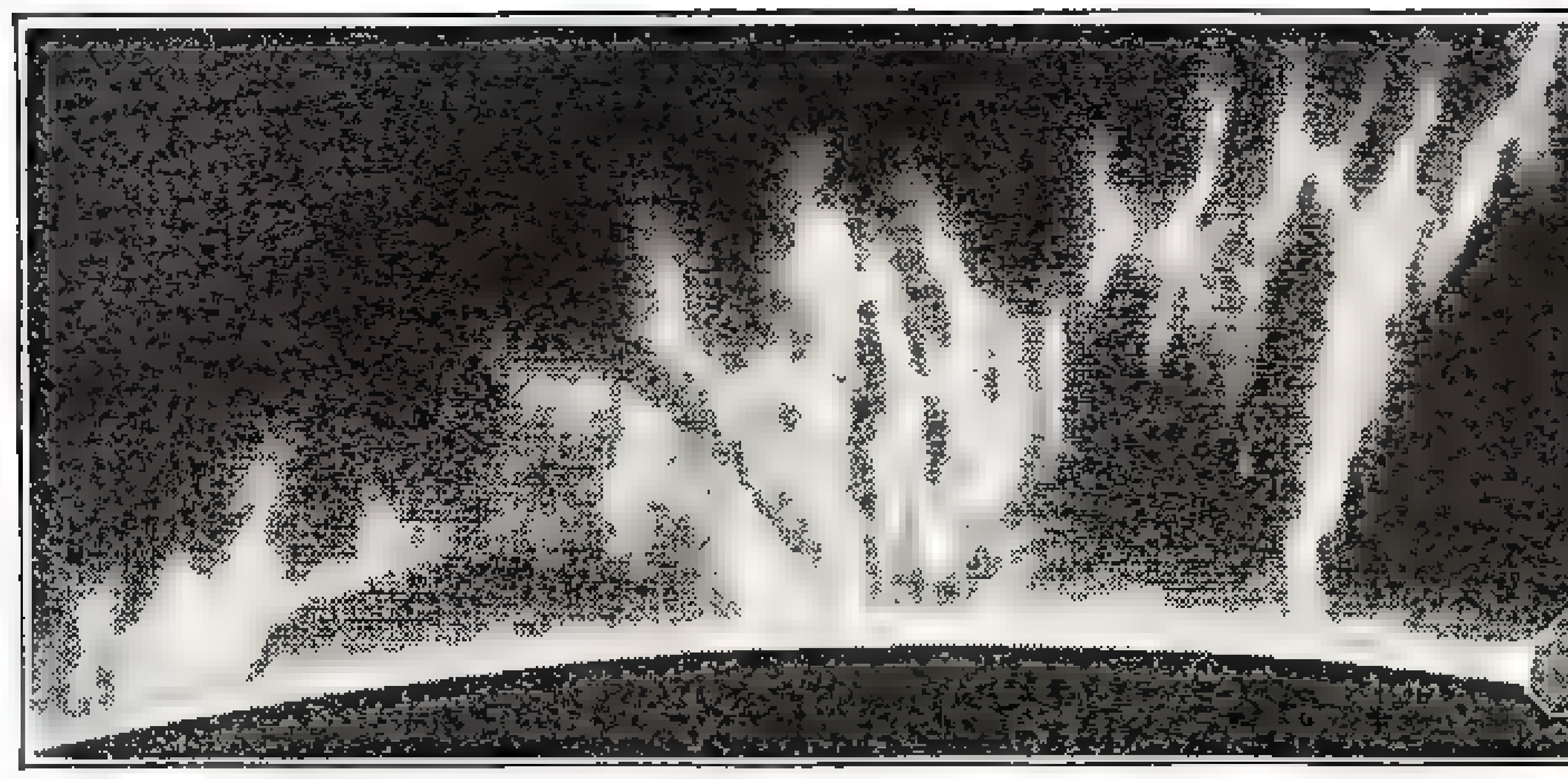


Three stages of chlorophyll production—the leaves, the powder and the pure chlorophyll.

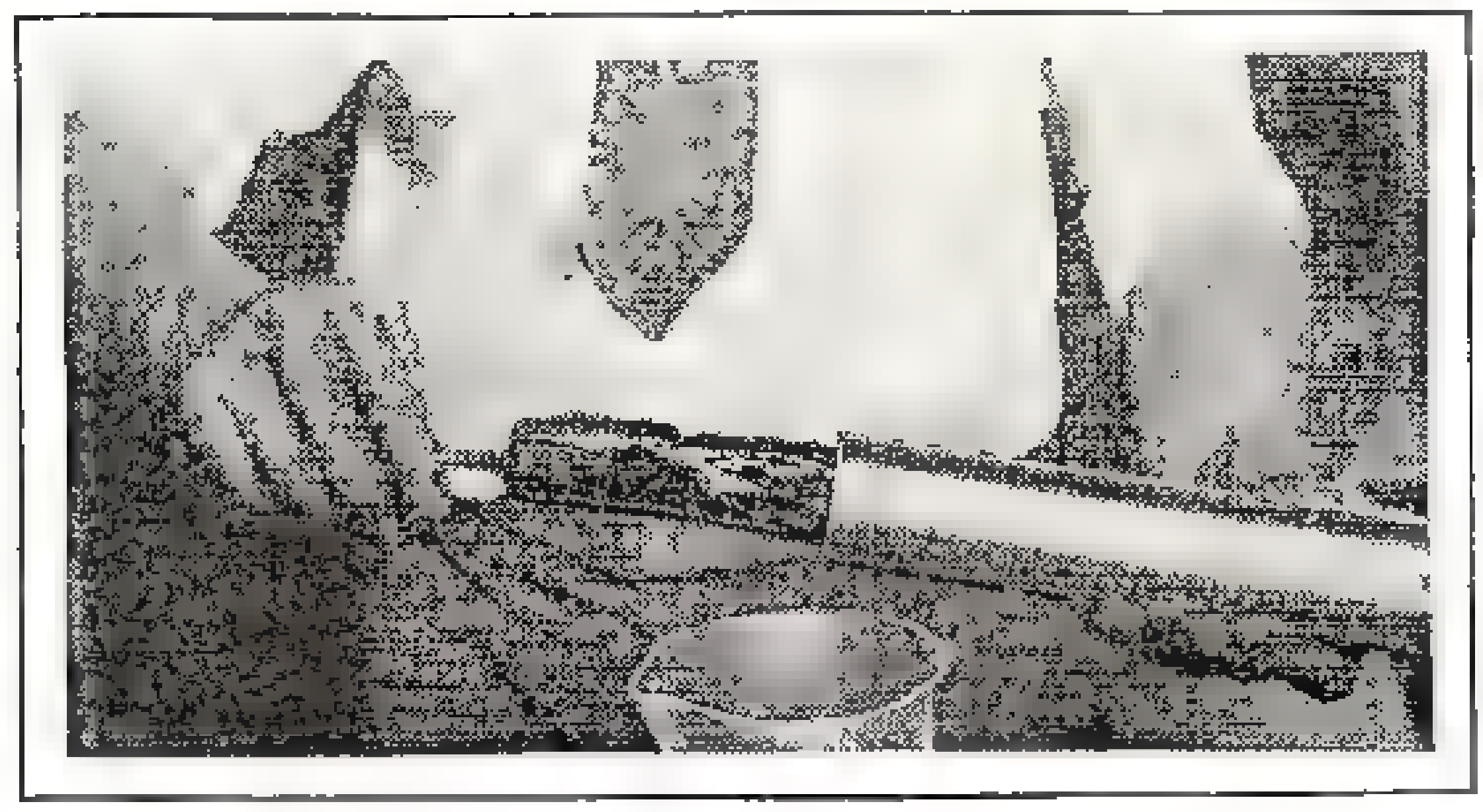


Second step—Dried leaves are placed in "ball mill" and ground to powder by stones rolling around in interior of revolving drum. Mask guards lungs against dust from leaves.

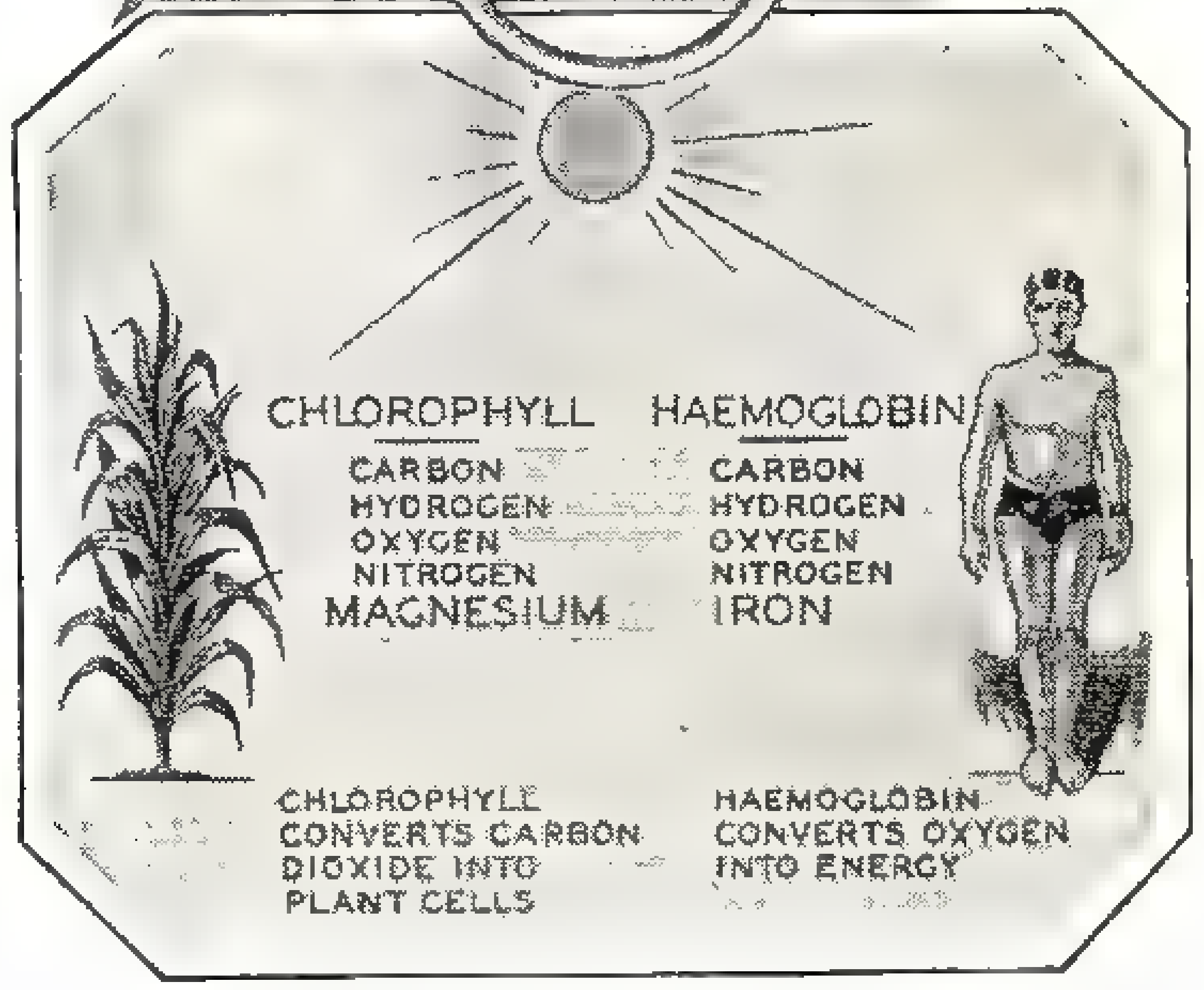
Third step—Liquid chlorophyll is run through silver lined centrifuge to remove all impurities. Dr. Schertz, who has achieved prominence for his experiments, is pouring.



Flaming surface of the sun, scientists believe, is source of the chlorophyll which colors plants and sustains life.



Here's a tube of pure chlorophyll, or "concentrated sunlight," extracted from a batch of leaves. At right scientist is seen measuring work performed (consumption of oxygen) by man sawing a board. Dosing with chlorophyll, tests showed, greatly increases energy production.


CHLOROPHYLL
CARBON
HYDROGEN
OXYGEN
NITROGEN
MAGNESIUM
HAEMOGLOBIN
CARBON
HYDROGEN
OXYGEN
NITROGEN
IRON
CHLOROPHYLL CONVERTS CARBON DIOXIDE INTO PLANT CELLS
HAEMOGLOBIN CONVERTS OXYGEN INTO ENERGY

Close relationship between green of plants (chlorophyll) and haemoglobin (blood) in human beings is seen in the chemical constituents of two life-giving substances. Note also similarity of the vital functions performed in organisms.

THE ancient sun worshippers, it now appears, had a theory of life, and its relationship to man, which has now been proven scientifically sound.

The chemists, biologists, physicians, have discovered that life comes from the sun. Furthermore, that plant life and human life are chemically related if not one and the same basic thing. Out of the laboratory of the organic chemist comes substances that show such a relationship.

Physicians have for many years been advising people to eat more green vegetables. "Old stuff!" you say? Yes, comparatively. But the green foods, such as lettuce leaves, spinach, kales and others, contain vitamins, needed by the human laboratory of the body.

Blood and the green of the leaves (chlorophyll) are practically identical. Chlorophyll contains carbon, hydrogen, oxygen, nitrogen and magnesium. The only chemical difference in the organic construction of the chlorophyll in plants and haemoglobin in blood is that the former contains magnesium while the latter contains iron.

German chemists taking their chlorophyll product that they derived from the leaves of growing plants, made them into pills which they gave to patients in clinics and hospitals, keeping a minute medical record of results. These pills, which may well be called "concentrated sunshine," produced amazing results. The facts, as recorded in the unemotional, matter-of-fact statements of the German scientists, would show that these chlorophyll pills reduced high blood pressure, eliminated anemia, made weak men strong, cured digestive troubles, and seemed to be in fact, a pill of youth.

Once in the digestive stream chlorophyll immediately enriches the blood. The red blood cells immediately increase in number while their haemoglobin content rises. (Hemin, of the blood, and chlorophyll, are practically identical.) The blood thus enriched and reinforced with new life is able to bring about amazing recoveries.

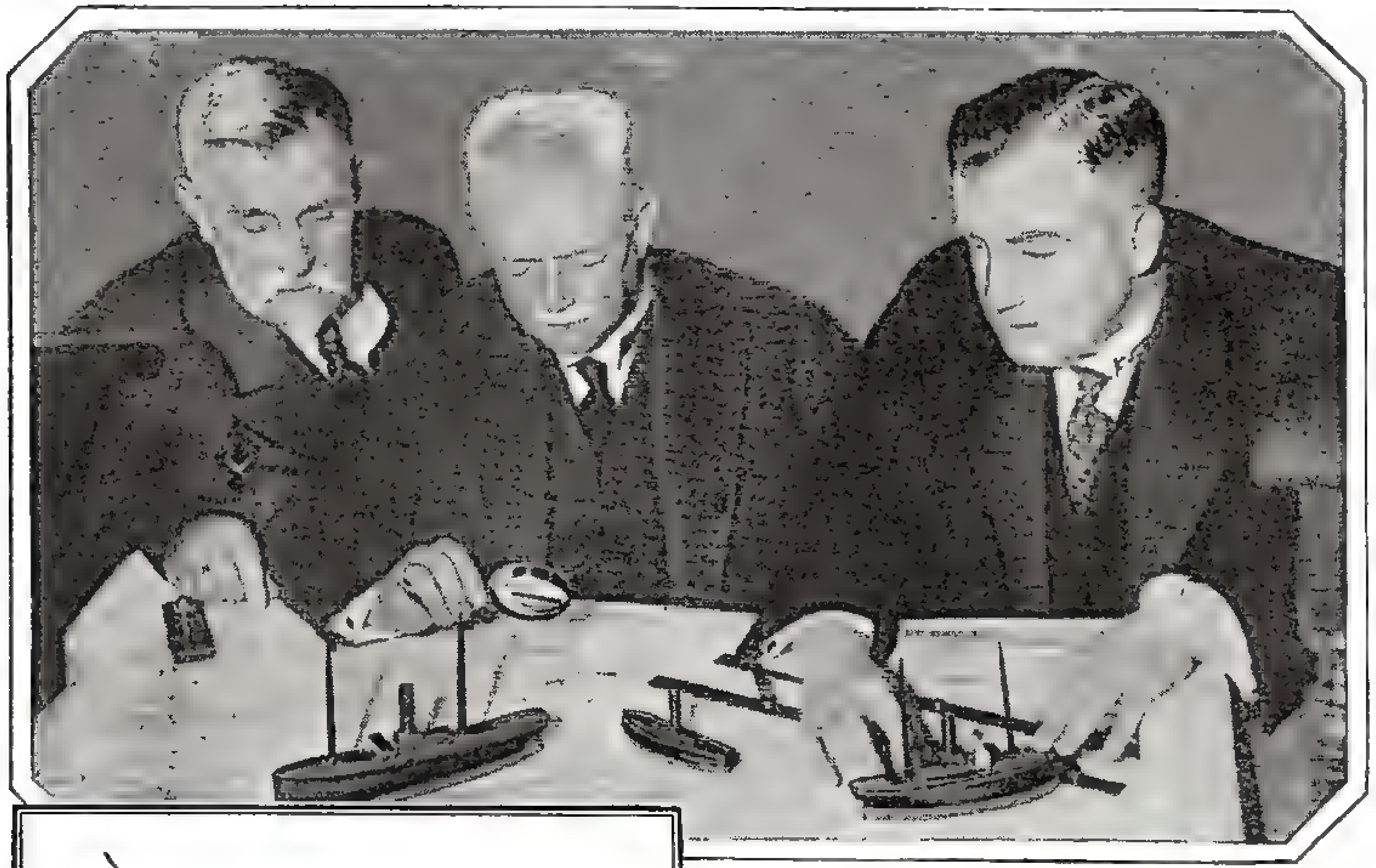
The eating of green foods is taking chlorophyll into the body's chemical laboratory, but the taking of a concentrated form is merely a short cut in giving the body a tremendous amount of it and the reaction is positive. The sunshine that the plant caught and benefited by is thus passed on in the form of blood-life for the human being.

Dr. Schertz, an eminent American chemist, suggests that chlorophyll gives us the clue as to just what life is. He has found a way to extract pure chlorophyll from plants easily and cheaply enough so that it can be used commercially, although he was not the first to isolate it.

The humanly useful place of chlorophyll is explained as the one link of nature for the converting of energy into matter. The energy reaches the earth in the form of sunlight and cosmic rays. By some mysterious process this energy is transformed in the plant into matter. The chlorophyll plays the chief role.

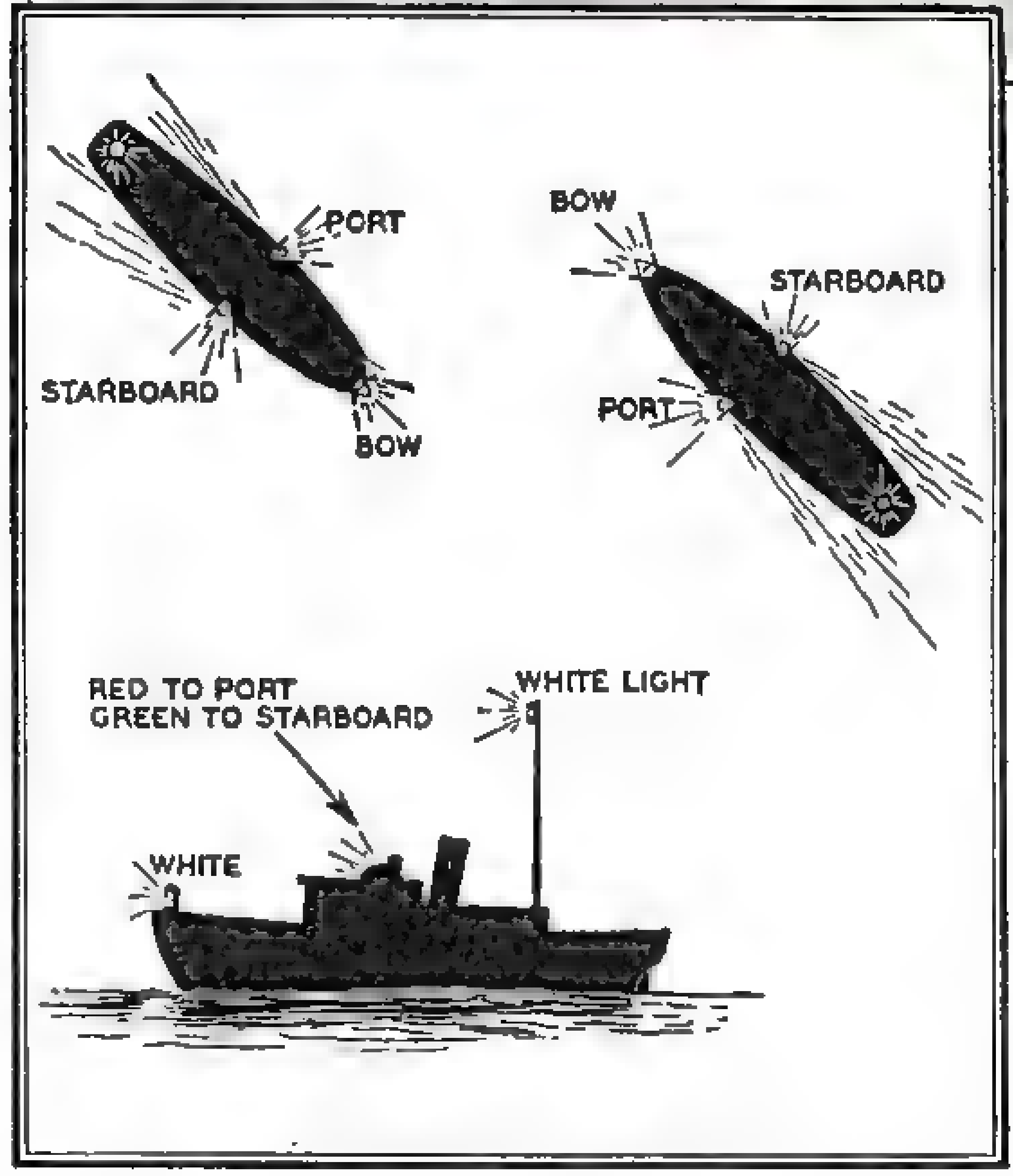
(Continued on page 141)

SEA COURTS EXPLAIN Accidents with MODELS



Admiral Von Usslar, representative of the German Reich, at left, is conferring with nautical counsel regarding the merits of an accident which is impossible to re-enact for juries without use of models, as otherwise the jurors invariably become confused with the unfamiliar terminology.

The jargon of the sea becomes doubly confusing to laymen who sit on juries that deal with nautical accidents. This article tells how models are used to re-enact the strange "rules of the road" for jurors who have never been to sea.



Here is the usual complement of running lights on small ships. "Green to green, or red to red, — perfect safety; go ahead" is the sailor's operating code.

HOW would you like to sit in on a "traffic" case involving perhaps a million dollars for an accident that took place where there are no roads?

Would the interpretations of the "rules of the road" bother you, especially if there were no avenue names, no curbs, no semaphores, no roads as we know them?

You bet your life they would. As a matter of fact, the most highly specialized judiciaries in the world are the maritime courts where the judge must not only be a sailor who understands the jargon of the sea, but must also be an astute juror versed in the hodge podge of legal meanings and shades.

The usual whereases, and deponent sayeths not of the courtroom are further mired in verbiage when the lingo of the sea is introduced. You can readily imagine what happens when a volley of words like "vessel of first part, being on port tack, deposes and says that vessel of second part, being also on port tack and converging upon course of vessel of first part, which unladen, had right of way over starboard bow dead ahead—," etc., are thrown at an ordinary jury. The result is chaos.

Consequently America, England, France and Germany, all nations who do a great deal of shipping, have their own special courts in Marine Chancery. Here, to make things clear to the jury, who are selected from among seafaring folk, models are used to re-enact the accidents or points of dispute.

Listing heavily as the beam wind strikes her sides, the liner "Atlantique" is here shown drifting toward the Cardiff cliffs of England, a mass of flames. This picture was taken but a short time ago, when the drama shown at right was enacted upon the high seas, demonstrating marine law.

The photographs show Admiral Von Usslar, representative of the German Reich, using some of these models in conjunction with charts to re-enact maritime disputes and accidents.

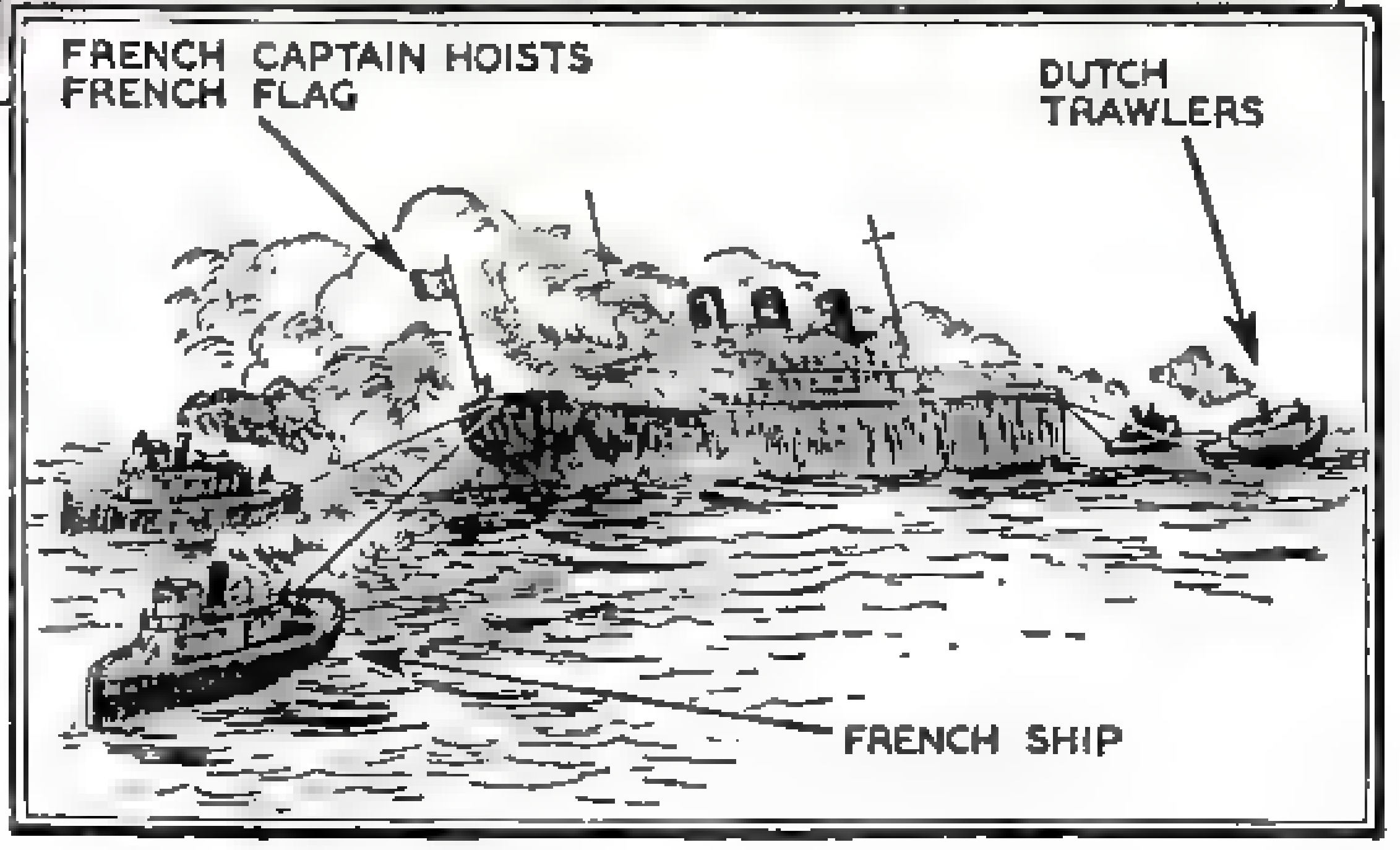
In no other manner could the physical positions of the free vessel and the offending vessel be kept clear in the minds of the untrained men who sit upon the case.

All nations have uniform "rules of the road" in that great International occupancy, the Sea. The courtesies, the lights, the flags and the manner of conducting shipping are all uniform.

Consequently, with so much room at one's disposal, the rules for the high seas are rather simple. The left hand side of a vessel, facing the bow, is the port side. The right hand side is the starboard side.

In sailor's parlance, in which the courts are conducted, port, starboard, port quarter, starboard quarter, dead astern and dead ahead are commonplace designations. Even these terms are fairly clear to a layman. But when one vessel bears down on another, what are the rules to follow?

Seamen have little ditties that hold good in cases like this. On the port side are red lights, on the starboard side are green lights, on the bow of the ship is a white light, and high above, toward the stern is another white light. This is required by International law.


FRENCH CAPTAIN HOISTS FRENCH FLAG
DUTCH TRAWLERS
FRENCH SHIP

A ship afloat without crew is the property of any vessel negotiating salvage. Dutch trawlers hooked to the "Atlantique" at the same time French vessels made fast to the stern. A tug of war ensued, neither nationality victorious until the French captain of the "Atlantique" was put aboard again to raise a French flag on the jackstaff, as shown.

When ships approach each other, the sailor recalls, "Green to green, or red to red, perfect safety—go ahead."

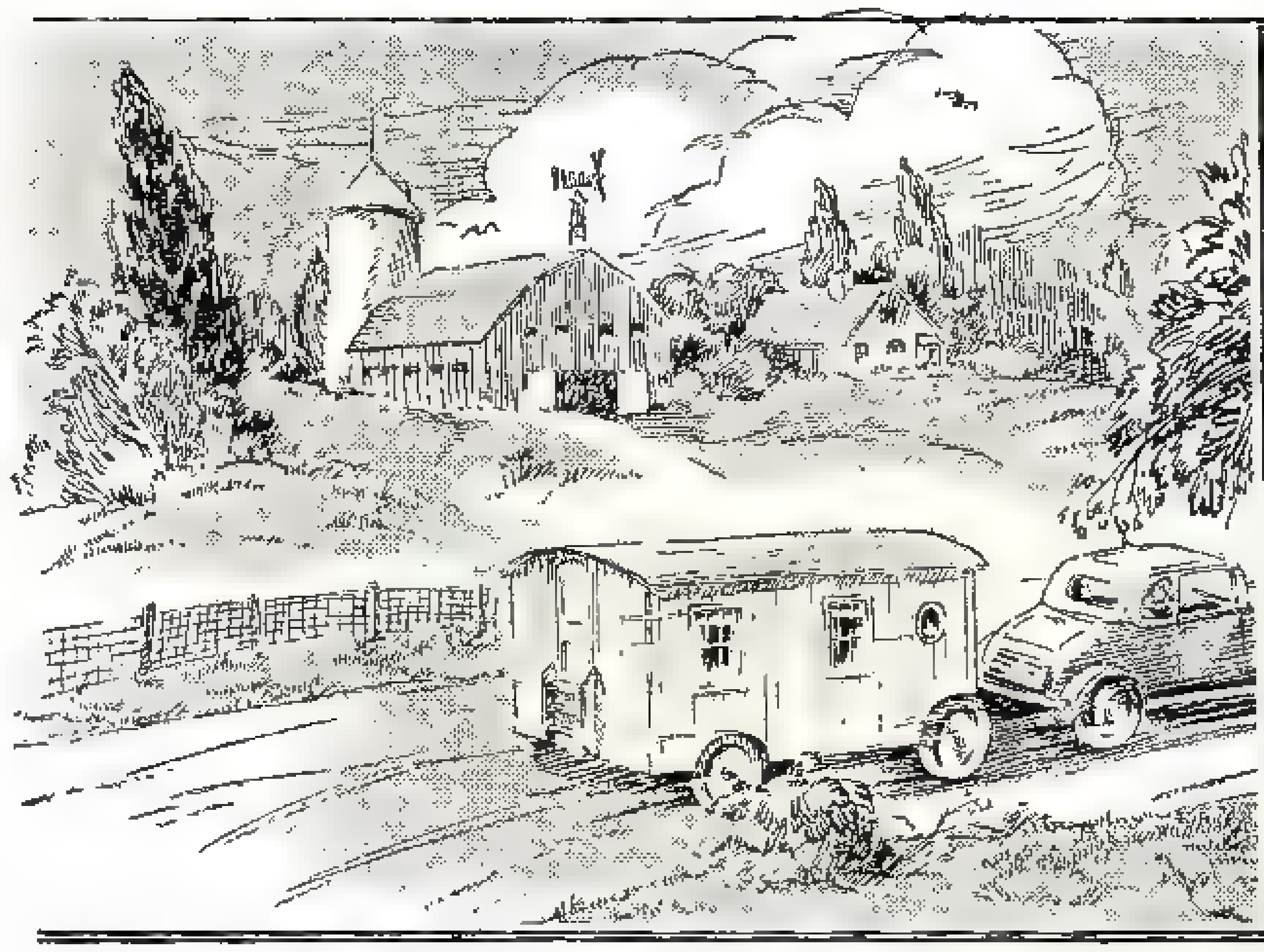
During the day this matter is simple, but it is at night when the navigation of the ship becomes confusing and must be conducted according to light.

Any other condition is met by another simple rule. Two vessels meeting head on will signal. If one has any special reason for wanting passage on a certain side, it will sound the whistle first. One blast means the vessel will pass to port, and two means it will pass to starboard. The other

Building the CABINETTE Cruise TRAILER

by JIM ALLENBY

Here is the trailer for the man who wants to see the country comfortably in a mobile home of his own. It can be built for around $50, according to locality, and will prove a satisfactory place to live on a country-wide tour.



Trailer cruising has become really a smart thing for people to do. This Cabinette idea is just another step farther along toward the ultimate in inexpensive and practical trailers for tourists.

THIS cruise trailer was designed to do but one thing, and to do that thing well: furnish a *comfortable* traveling accessory to the modern tourist in which he could live.

There is room enough for four bunks, although only two have been shown. There is a water closet, and a sludge tank for dishwater and sewage can be installed under the house for use when parked in some place too pretty to despoil; there is an adequate galley or kitchen containing a sink with running water; there is a pantry for the storage of food; there is a bureau for nick nacks.

Every function of living has been accommodated simply, yet adequately. One can live, sleep, eat aboard this cruising trailer, and carry his home with him wherever he goes.

The factor on which the whole design hinges is the chassis. We use an old Model T Ford chassis as they are the easiest of all old auto frames to procure, and as well are notoriously long lived and free from wheel trouble. Also the tires are dirt cheap.

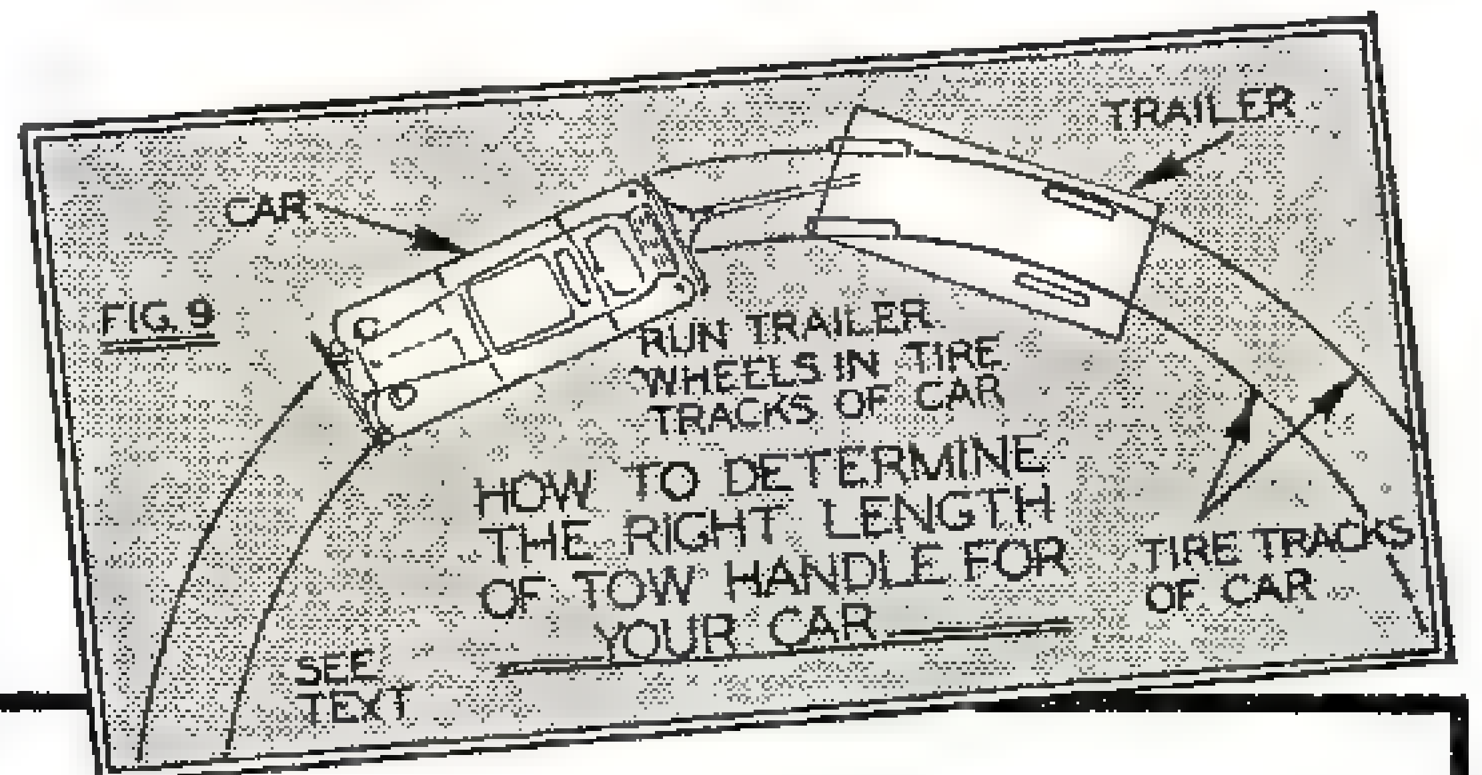
The best way to work is from the ground up, and the first thing to tackle is the conversion of the trailer.

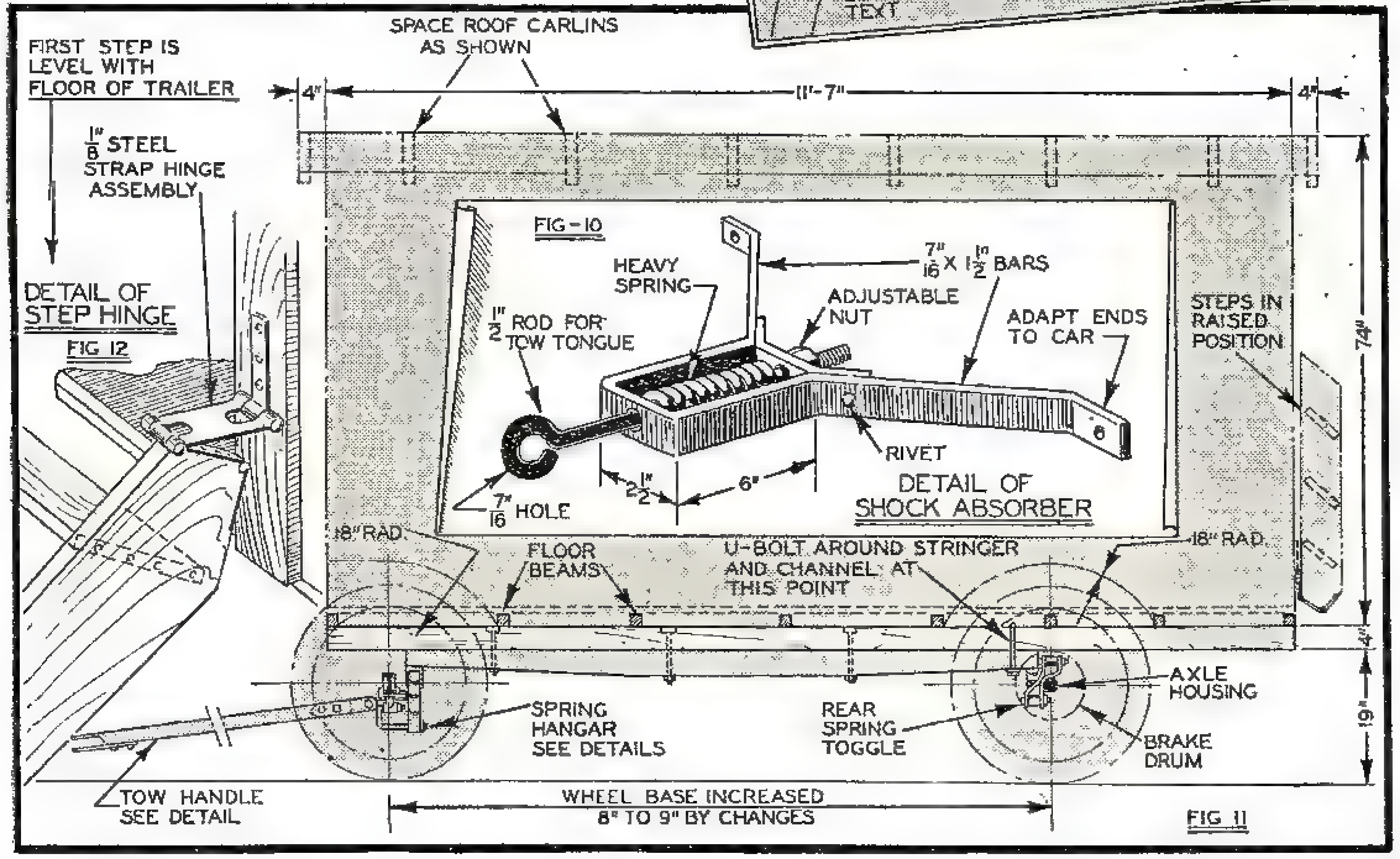
The building of the body or cab is simple as we have designed it, but the matter of underslinging a Ford chassis is a horse from another stable, and therefore let's go into this most important end thoroughly.

As shown in Fig. 7, top, the Ford channel frame is 23 inches wide. It is four inches higher at the rear than at the front. Also the frame proper is way up in the air, far too high to allow us to put on a cab body with nearly full 6-ft. headroom unless we lower it.

Make strap spring shackles for the rear end as the drawings show. Any blacksmith can do this for you for very little money if you don't have the facilities yourself.

The idea here is to get the shackle long enough to let the whole frame down so it is level. The wheels are mounted into the new spring perches, see Fig. 3, and the radius rods heated with a welding torch, bent, and re-seated. This takes care of the rear end, just as simple as that. See Fig. 8.


TRAILER
CAR
FIG. 9
RUN TRAILER WHEELS IN TIRE TRACKS OF CAR
HOW TO DETERMINE THE RIGHT LENGTH OF TOW HANDLE FOR YOUR CAR
TIRE TRACKS OF CAR
SEE TEXT

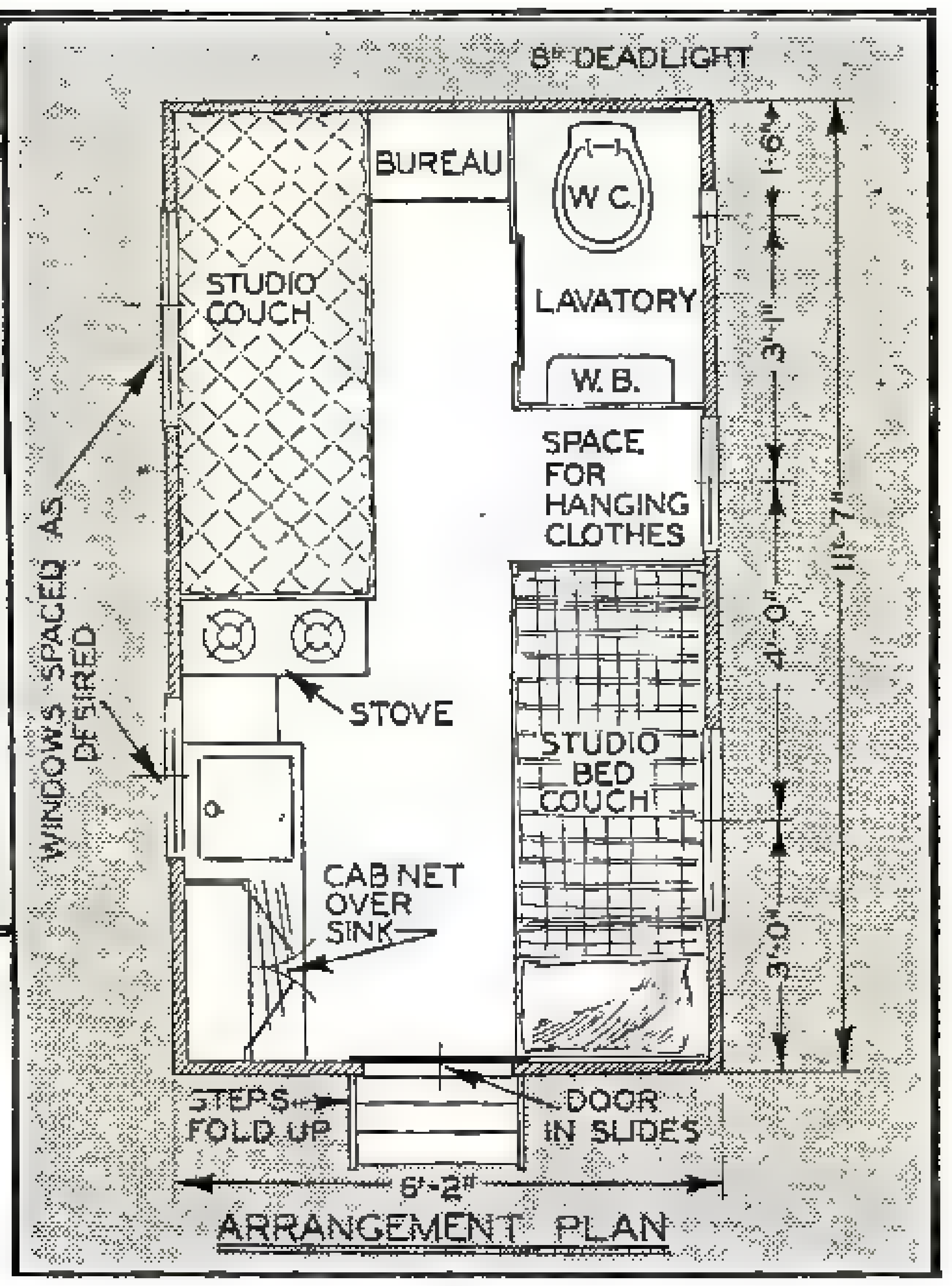

FIRST STEP IS LEVEL WITH FLOOR OF TRAILER
SPACE ROOF CARLINS AS SHOWN
4"
11'-7"
4"
1/8" STEEL STRAP HINGE ASSEMBLY
DETAIL OF STEP HINGE
FIG 12
FIG-10
HEAVY SPRING
7/16" X 1 1/2" BARS
ADJUSTABLE NUT
1/2" ROD FOR TOW TONGUE
ADAPT ENDS TO CAR
STEPS IN RAISED POSITION
74"
RIVET
2 1/2"
6"
7/16" HOLE
DETAIL OF SHOCK ABSORBER
18" RAD.
FLOOR BEAMS
U-BOLT AROUND STRINGER AND CHANNEL AT THIS POINT
18" RAD.
4"
AXLE HOUSING
19"
SPRING HANGAR SEE DETAILS
REAR SPRING TOGGLE
BRAKE DRUM
TOW HANDLE SEE DETAIL
WHEEL BASE INCREASED 8" TO 9" BY CHANGES
FIG 11

The little drawing in Fig. 9 shows how to determine the right length of tongue for the towing arm. The middle inset shows a fine shock absorbing hook-up to be attached to the towing car. Fig. 11, below, shows how the stringers are attached to the channel frames after the chassis has been underslung.

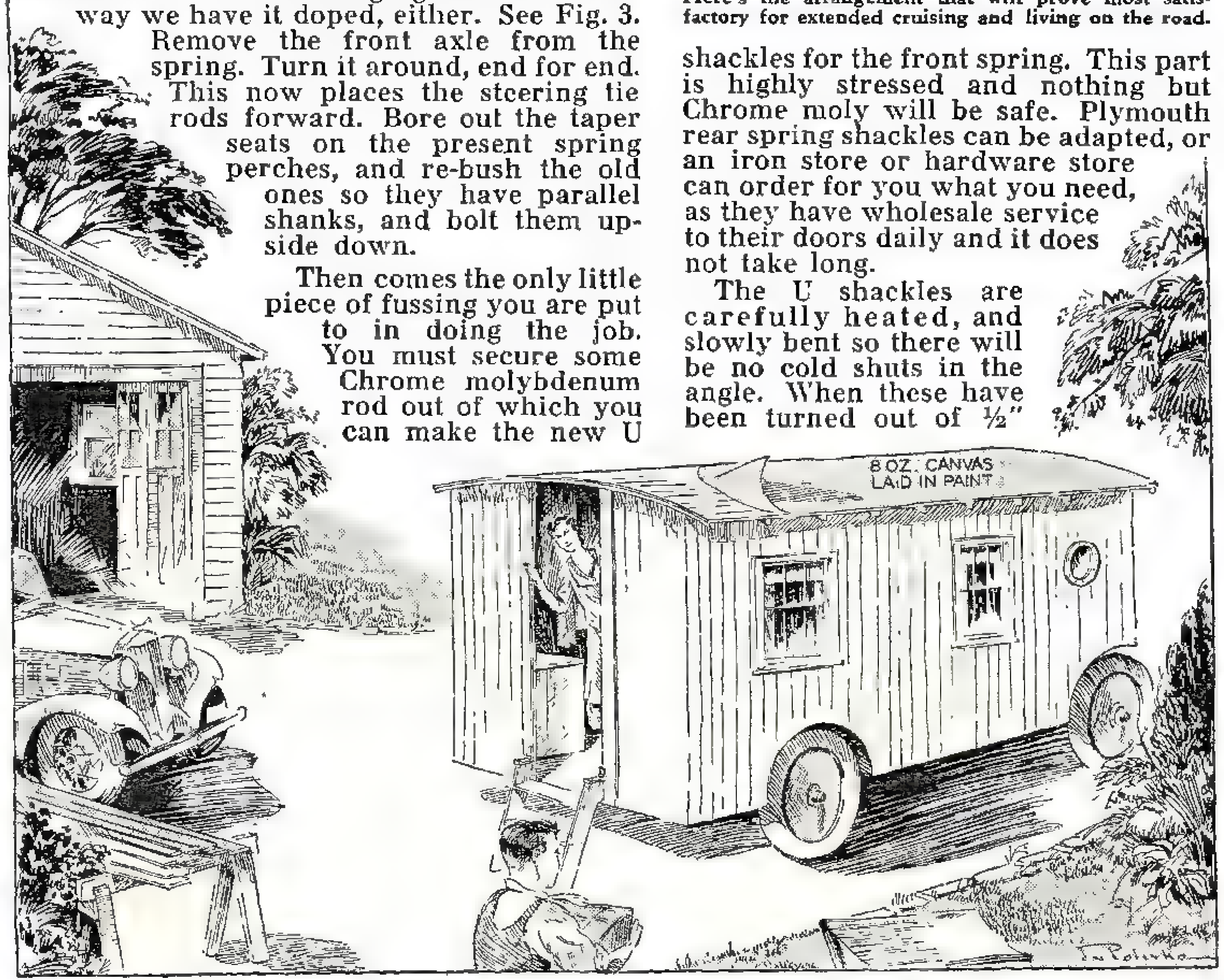
The front end underslinging is not hard the way we have it doped, either. See Fig. 3. Remove the front axle from the spring. Turn it around, end for end. This now places the steering tie rods forward. Bore out the taper seats on the present spring perches, and re-bush the old ones so they have parallel shanks, and bolt them upside down.

Then comes the only little piece of fussing you are put to in doing the job. You must secure some Chrome molybdenum rod out of which you can make the new U shackles for the front spring. This part is highly stressed and nothing but Chrome moly will be safe. Plymouth rear spring shackles can be adapted, or an iron store or hardware store can order for you what you need, as they have wholesale service to their doors daily and it does not take long.

The U shackles are carefully heated, and slowly bent so there will be no cold shuts in the angle. When these have been turned out of ½"

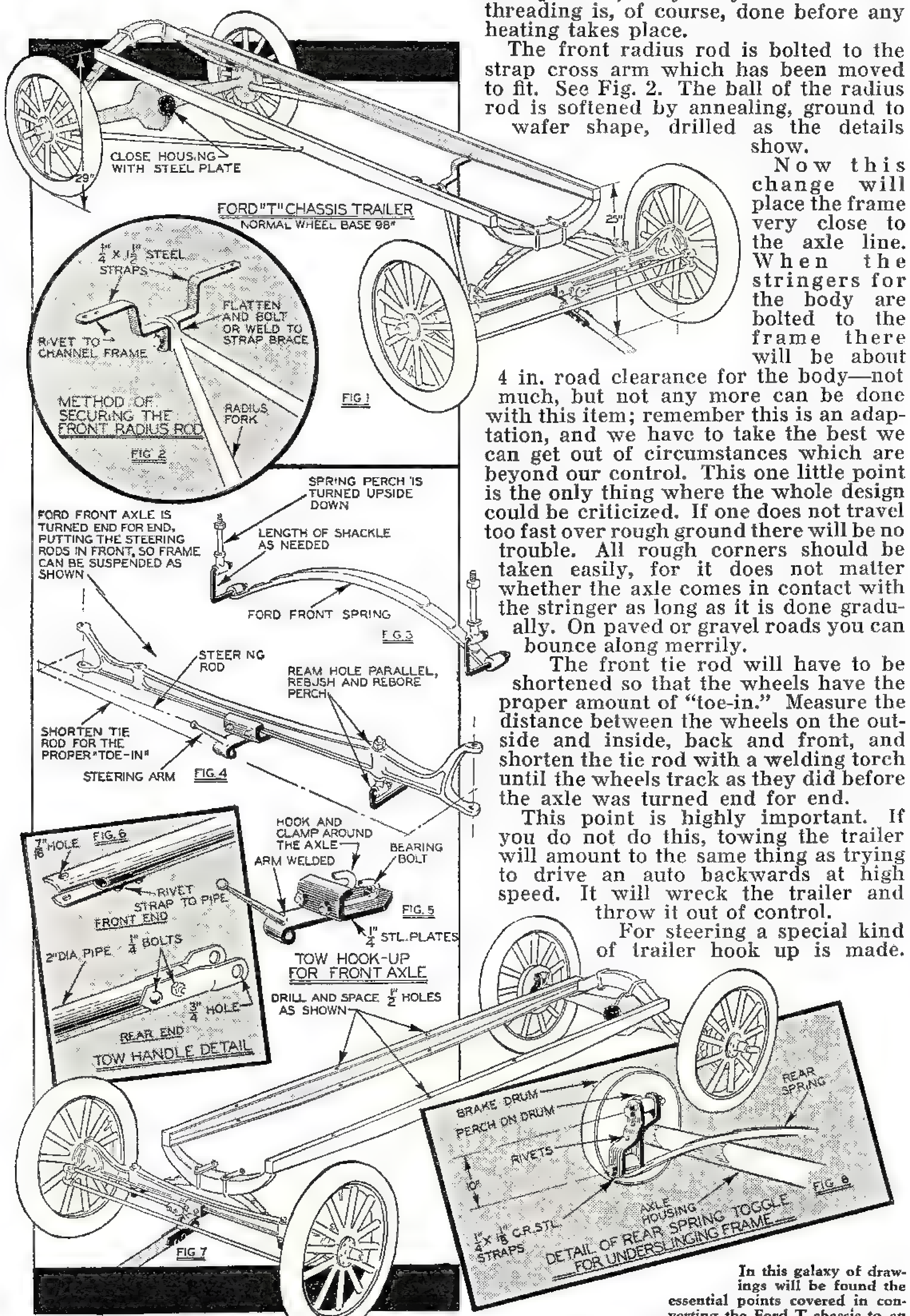

8" DEADLIGHT
BUREAU
W.C.
STUDIO COUCH
LAVATORY
W.B.
SPACE FOR HANGING CLOTHES
1'-6"
3'-1"
4'-0"
3'-0"
11'-7"
WINDOWS SPACED AS DESIRED
STOVE
STUDIO BED COUCH
CAB NET OVER SINK
STEPS FOLD UP
DOOR IN SLIDES
6'-2"
ARRANGEMENT PLAN

Here's the arrangement that will prove most satisfactory for extended cruising and living on the road.


8 OZ. CANVAS LAID IN PAINT

The Cabinette cruising trailer can be wheeled to any spot, no matter how wild or how civilized, and be a self contained living unit with its own water and sewage system. Privacy, comfort and adequacy are all yours with this simple job.

Steps to Follow in Conversion


CLOSE HOUSING WITH STEEL PLATE
29"
25"
FORD "T" CHASSIS TRAILER
NORMAL WHEEL BASE 98"
FIG 1
1/4" X 1 1/2" STEEL STRAPS
FLATTEN AND BOLT OR WELD TO STRAP BRACE
RIVET TO CHANNEL FRAME
METHOD OF SECURING THE FRONT RADIUS ROD
RADIUS FORK
FIG 2
SPRING PERCH IS TURNED UPSIDE DOWN
FORD FRONT AXLE IS TURNED END FOR END, PUTTING THE STEERING RODS IN FRONT, SO FRAME CAN BE SUSPENDED AS SHOWN
LENGTH OF SHACKLE AS NEEDED
FORD FRONT SPRING
FIG 3
STEERING ROD
REAM HOLE PARALLEL, REBUSH AND REBORE PERCH
SHORTEN TIE ROD FOR THE PROPER "TOE-IN"
STEERING ARM
FIG. 4
HOOK AND CLAMP AROUND THE AXLE
ARM WELDED
BEARING BOLT
FIG. 5
1/4" STL. PLATES
TOW HOOK-UP FOR FRONT AXLE
7/16" HOLE
FIG. 6
RIVET STRAP TO PIPE
FRONT END
2" DIA. PIPE
1/4" BOLTS
3/4" HOLE
REAR END
TOW HANDLE DETAIL
DRILL AND SPACE 1/2" HOLES AS SHOWN
BRAKE DRUM
PERCH ON DRUM
RIVETS
10"
1/4" X 1 1/8" C.R. STL. STRAPS
AXLE HOUSING
REAR SPRING
FIG. 8
DETAIL OF REAR SPRING TOGGLE FOR UNDERSLINGING FRAME
FIG 7

In this galaxy of drawings will be found the essential points covered in converting the Ford T chassis to an underslung trailer chassis. Fig. 1 shows normal Ford chassis but with tie rods in front. Below is shown chassis finally converted.

stock for the ends to land in the spring and perches, they may be bent. The threading is, of course, done before any heating takes place.

The front radius rod is bolted to the strap cross arm which has been moved to fit. See Fig. 2. The ball of the radius rod is softened by annealing, ground to wafer shape, drilled as the details show.

Now this change will place the frame very close to the axle line. When the stringers for the body are bolted to the frame there will be about 4 in. road clearance for the body—not much, but not any more can be done with this item; remember this is an adaptation, and we have to take the best we can get out of circumstances which are beyond our control. This one little point is the only thing where the whole design could be criticized. If one does not travel too fast over rough ground there will be no trouble. All rough corners should be taken easily, for it does not matter whether the axle comes in contact with the stringer as long as it is done gradually. On paved or gravel roads you can bounce along merrily.

The front tie rod will have to be shortened so that the wheels have the proper amount of "toe-in." Measure the distance between the wheels on the outside and inside, back and front, and shorten the tie rod with a welding torch until the wheels track as they did before the axle was turned end for end.

This point is highly important. If you do not do this, towing the trailer will amount to the same thing as trying to drive an auto backwards at high speed. It will wreck the trailer and throw it out of control.

For steering a special kind of trailer hook up is made. See Figs. 4, 5 and 6. The drawings show how a plate of ¼" wrought iron is bent around the axle, and secured with two ½" hook bolts which can be made by any blacksmith.

A ¾" hardened steel pin is run through the towing tongue and this plate. It forms the pintle through which the towing and turning stresses are focused. It therefore must be this heavy, and be hardened.

The Trailer Tongue

The tongue itself is of pipe. Two-inch pipe will do. An alligator mouth is sawed in one end, and a piece of hardened strap is riveted on the end. If the pipe is left top and bottom to carry the load it will soon chew off and you are in danger of losing your trailer. With a piece of hardened strap on the tongue you know *that* can never give way.

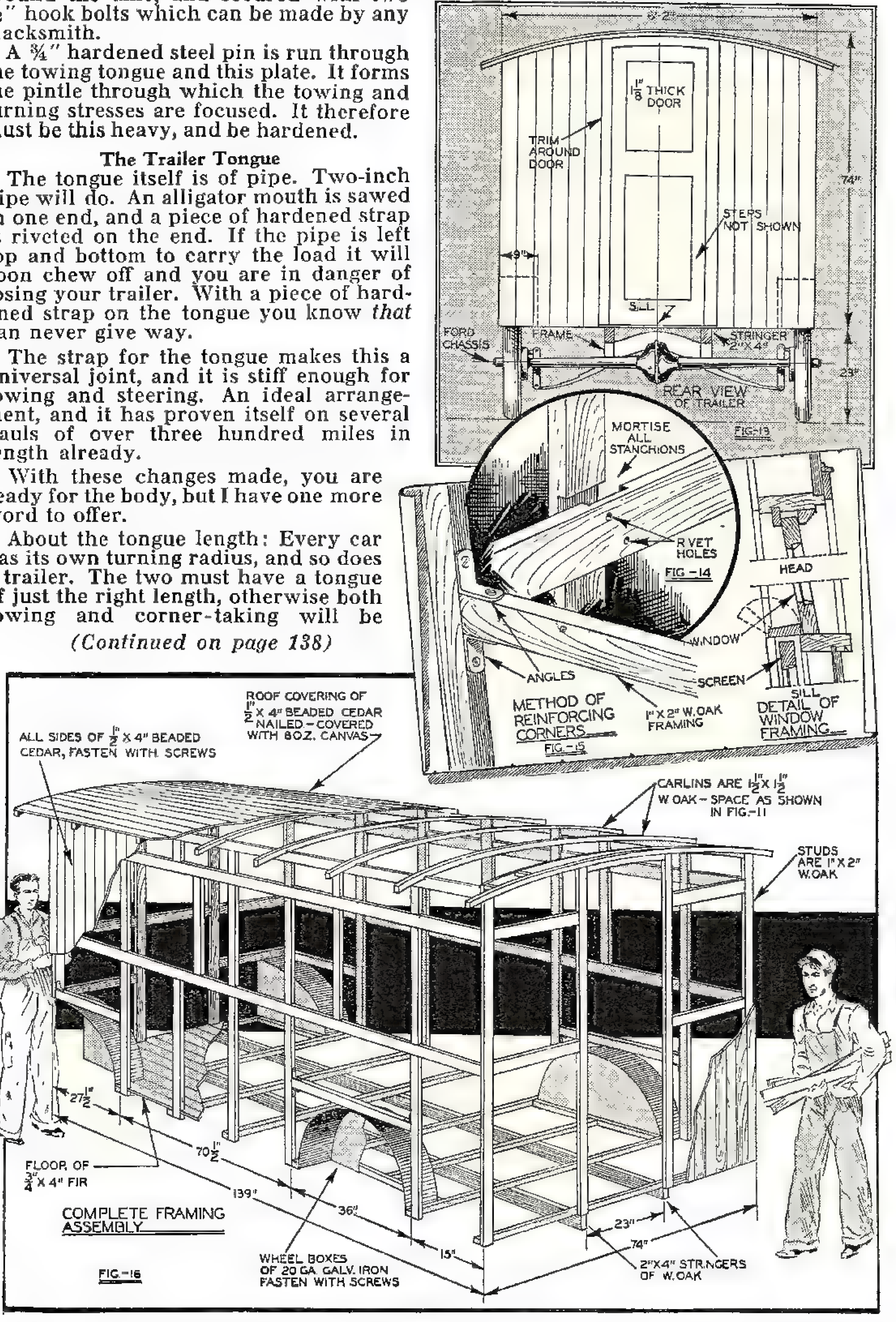
The strap for the tongue makes this a universal joint, and it is stiff enough for towing and steering. An ideal arrangement, and it has proven itself on several hauls of over three hundred miles in length already.

With these changes made, you are ready for the body, but I have one more word to offer.

About the tongue length: Every car has its own turning radius, and so does a trailer. The two must have a tongue of just the right length, otherwise both towing and corner-taking will be

(Continued on page 138)

Details of Strong, Simple Framing


6'2"
1 1/8" THICK DOOR
TRIM AROUND DOOR
74"
STEPS NOT SHOWN
9"
SILL
FORD CHASSIS
FRAME
STRINGER 2"X4"
23"
REAR VIEW OF TRAILER
FIG-13
MORTISE ALL STANCHIONS
RIVET HOLES
FIG-14
HEAD
WINDOW
ANGLES
SCREEN
SILL
1"X2" W. OAK FRAMING
METHOD OF REINFORCING CORNERS
FIG-15
DETAIL OF WINDOW FRAMING
ROOF COVERING OF 1/2"X 4" BEADED CEDAR NAILED - COVERED WITH 8OZ. CANVAS
ALL SIDES OF 1/2" X 4" BEADED CEDAR, FASTEN WITH SCREWS
CARLINS ARE 1 1/2"X 1 1/2" W. OAK - SPACE AS SHOWN IN FIG.-11
STUDS ARE 1"X 2" W. OAK
27 1/2"
70 1/2"
FLOOR OF 3/4"X 4" FIR
139"
36"
COMPLETE FRAMING ASSEMBLY
15"
23"
74"
WHEEL BOXES OF 20 GA. GALV. IRON FASTEN WITH SCREWS
2"X4" STRINGERS OF W. OAK
FIG.-16

Top right shows rear elevation with miscellaneous details. Middle detail, Figs. 14 and 15, show framing and window details. Below in Fig. 16 are shown major elements in straightforward framing plan. Materials can be procured locally.

A Wooden WATER Wheel for the FARM STREAM

All that is needed is a six-foot head on a 16"x16" flume in order to get 1½ h.p. from this simple wheel. It is of the overshot type, and housed in the dog house above are the pump and dynamo it is capable of driving day in and day out.

This simple wheel will develop a full one and one-half horsepower on a head of only six feet through a sixteen inch flume. Many farms can take advantage of natural resources in securing light and power this way.

by JOHN S. CARPENTER

HERE are complete plans and instructions to build a 5 foot rustic wheel for the farm—one developing under only 6 foot fall at full capacity, an honest 1½ horse power! It will drive a 1 kilowatt electric generator at night and the house pump by day; furnish about 30 twenty five watt lights at night and lots of water by day.

First, cut out 24 curved segments as shown in Fig. 1, to make the two side rims. Each rim is to have two layers, break the joints midway and nail together with cement coated nails, if you can get them, on 3 inch centers. Cut the segments out on a band saw to dimensions. One segment takes a piece of lumber 11x¾x30 inches exact.

Now cut out 46 pieces of 3x¾x19 inches long tongue and grooved boards and nail to the inside of the rings as shown in Fig. 2. Lay these tongued and grooved pieces up rather tightly, as they are meant to hold water under a little pressure, two nails each on each end. These go all the way around the inner rim.

Next make 14 water buckets as shown in Fig. 6, beveled at the tip where it cuts the water jet, and nailed with 5 nails to the backing piece. This will require 14 pieces each of 8x¾x16 inches long and 5x¾x16 inches long.

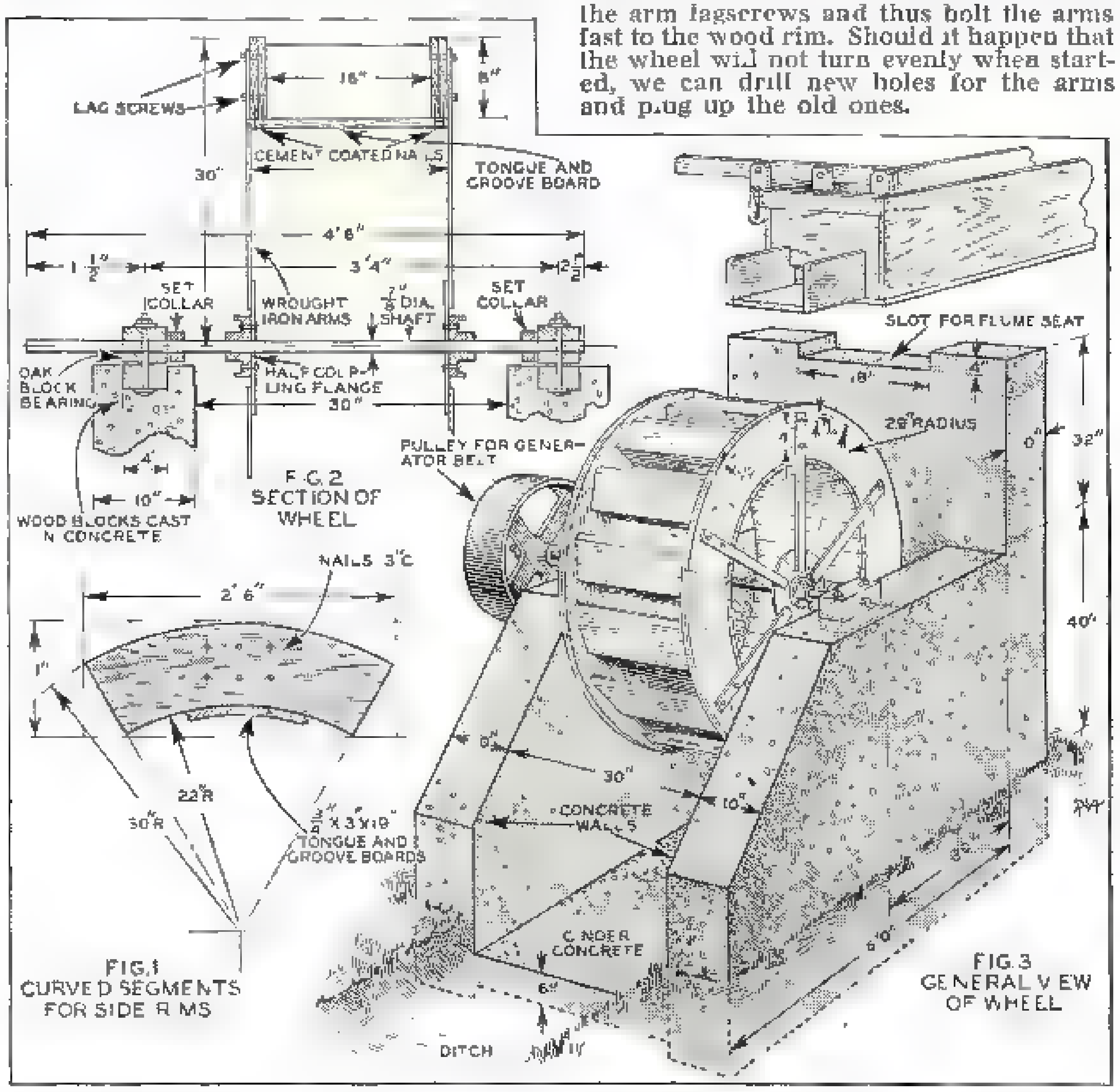
Using a scratch awl, lay off a circle 1 inch in from the outside circular rim, on the faces that are to be the inside of the wheel. Then lay off 14 spaces along these circles, with your rule, or dividers set at 12⅞ inches, which will thus divide off equally, the bucket spacing. Set the beveled tips "A" Fig. 6, on these spacing marks all around the rims, so the buckets will be correctly spaced and so the wheel will not run lopsidedly. Toe nail the buckets in the rims and see that the seat "B" comes down squarely on the ¾x3 pieces nailed inside the ring. If they do not, a little beveling at "B", Fig. 4, will make it right. Be sure that the buckets fit rather snugly in the rims, but not excessively tight.

To make the hub and arms, we first get a 1⁷⁄₁₆ inch flange coupling and taking it apart, use half for each hub. Now get two discs of boiler iron or scrap sheet steel and have a 2 inch rough hole burned in the center of each disc. These discs should be ¼ inch thick by 15 inches in diameter, shown in Fig. 4. They can be cut sufficiently round with the welder's cutting torch. Mark off and drill the discs centrally from the holes in the coupling halves and bolt the discs fast to the coupling halves.

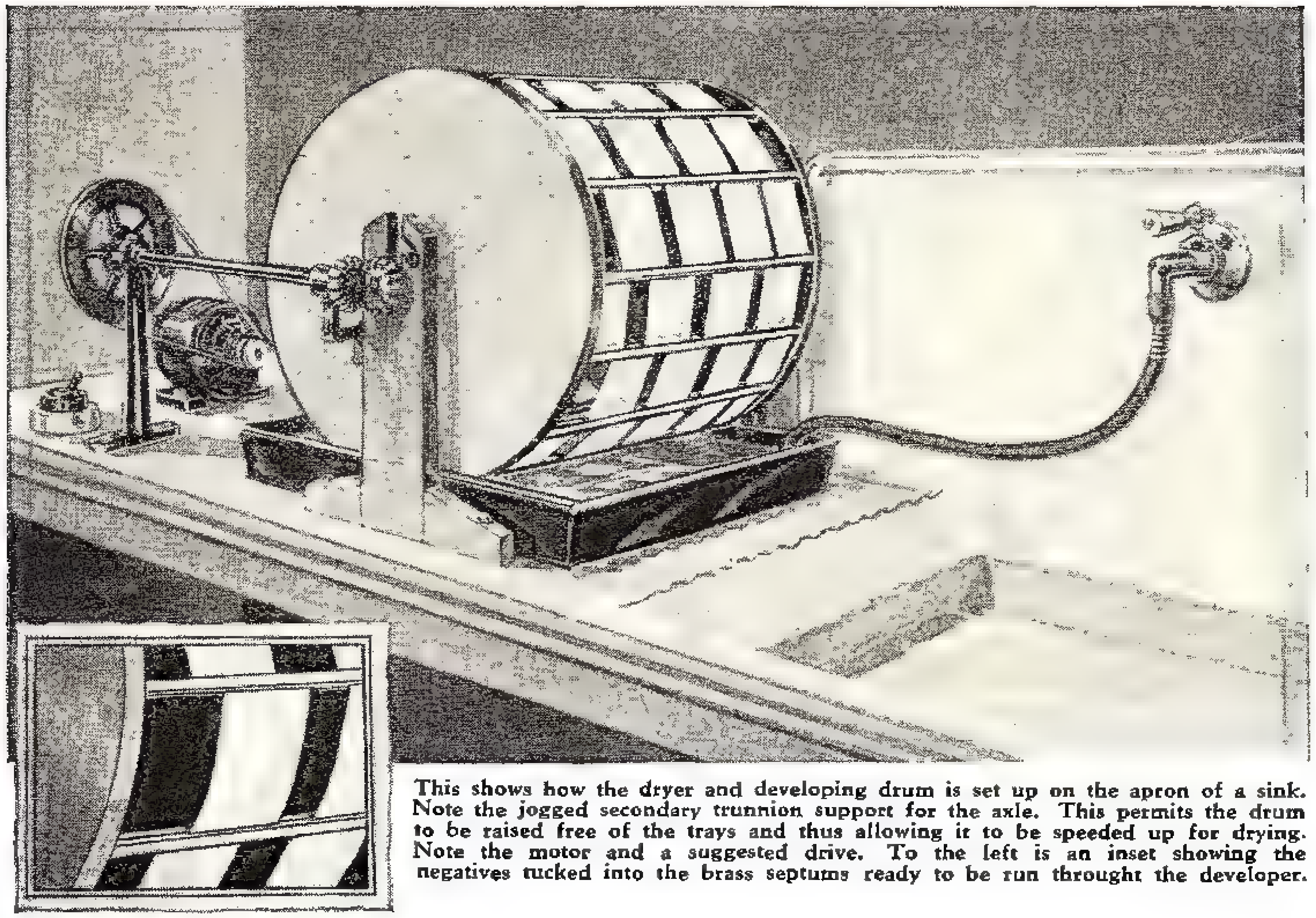
Have six ¼x1½ wrought iron bars each 25½ inches long welded to the discs as shown in Fig. 4, placing the arms radially on 29 inches radius. When the arms are spaced correctly around the disc, the distance apart at the tips of same, center to center, will just measure 29 inches. Punch two ½ inch holes in one end of the arms as shown for bolting the arms to the wood rims with lagscrews.

Now let us get the shaft ready. It should be of 1⁷⁄₁₆ inch diameter, 4 ft. 6 inches long, sawed off square on each end, but not necessarily turned off.

We are now ready to bolt the arms to the wood rim and this should be done with the arms on the shaft, as in Fig. 4, so everything is lined up centrally. Using a rule, measure to see that the shaft is placed in the center of the wood rims, as this is important for good running balance. The shaft need not be key seated, but the coupling hubs can be drilled and tapped for ½ inch setscrew in each and the cone points of the setscrews can be let into the shaft about ¼ inch after the location has been found. Now we can mark off the holes for the arm lagscrews and thus bolt the arms fast to the wood rim. Should it happen that the wheel will not turn evenly when started, we can drill new holes for the arms and plug up the old ones.



Curved segments, 24 in number, are used in the construction of the wheel as shown in Fig. 1. The centerline of the wheel is 40" above the run-off water to get good clearance without sacrifice of head. Fig. 3 shows the concrete spillway.



This shows how the dryer and developing drum is set up on the apron of a sink. Note the jogged secondary trunnion support for the axle. This permits the drum to be raised free of the trays and thus allowing it to be speeded up for drying. Note the motor and a suggested drive. To the left is an inset showing the negatives tucked into the brass septums ready to be run throught the developer.

Labor Saving Photo Developer

by ROBERT C. QUIGLEY

Developing, Fixing and Washing Done on Single Automatic Machine

THE professional photographer always has a lot of work on hand. The amateur, more and more nowadays, saves a batch of films and then does 'em all up in a hurry.

Both of these gentlemen give splendid imitations of a one-armed paper hanger caught in a high wind when they get in their dark-rooms and try to wash each print, one right after the other. Generally law and order go up the flue and hit and miss arrive with a flourish. But here's a rig that organizes a relatively large amount of work and pushes it through the soup with a delightfully progressive orderliness. The machine is at once a developing machine and a dryer.

Tray Slips Under Disk

Two wooden discs about 24" in diameter are mounted on an axle which is connected to a motor by gearing and pulleys so that the wheel will turn 78 r. p. m. on one belt and 300 r. p. m. on another.

The axle mounting is loose so that the developer tray can be slipped under it when it is raised, and successive trays of developer, water, hypo, and water can be used.

Then the drum can be raised and the high speed belt used to whirl the negatives until they are dry. The same procedure can be used for prints in their intermediary stages of drying before they become curled and after they have dried sufficiently to be inserted in the brass septums.

These marginal septums are made from brass rod and are spaced according to the size of the cut negative. There is a small slot run into them on the milling machine. If you do not have the facilities for making these slots any machine shop will welcome the work of putting them in for you on their miller.

How the Film Is Held

The ends are flattened and screwed to the discs. The film will snap out enough to be held with sufficient rigidity in the slots while the drum is rotating.

Brass and bronze should be used for the fastenings as they are chemically inert to most of the mild acids once a salt has been formed on them similar to rust, and they do not deteriorate after that.

No formula can be given directly for the exact size of the wheel and for the exact speed. So much depends upon the element of time used to develop, wash, fix and rinse. The way to approach the determination of speeds is to equate the time normally consumed in developing to the trip time through the developing bath, working down from the speed of the motor and the pulley ratios, using a fixed motor speed of 1,750 r. p. m., which is the fixed speed of all induction motors running on 110 volts a. c. This will allow you to put in the films on one side and to take them out on the other, dropping them into the fixing bath.

Another tray can then be lined up and the wheel run with its set of prints for the right amount of time in the hypo. Then the washing can be done for a much more thorough job in less time by continuing the same speed and running in a tray of mildly circulating water.

In Use as a Dryer

When thoroughly washed, the wheel is speeded up to the figure given, 300 r. p. m., which will create a breeze on both faces of the negatives and do a good job of drying. On my machine I found that water spots due to irregular drying were done away with, and the films dried without curling, due to the evenly distributed pressure over their faces because of centrifugal force.

For a man with a lot of professional work to do such as is found in the 8-hour photo finishing service, these machines might well make the nucleus of a good business, especially in many of the smaller towns.

In that case it would be a good idea to have several drums, and load one with exposed negatives, put it in the developer, and remove the whole wheel to the fixing bath, then move the whole wheel on to the other baths, having a wheel for each of the baths if the amount of work warranted it.

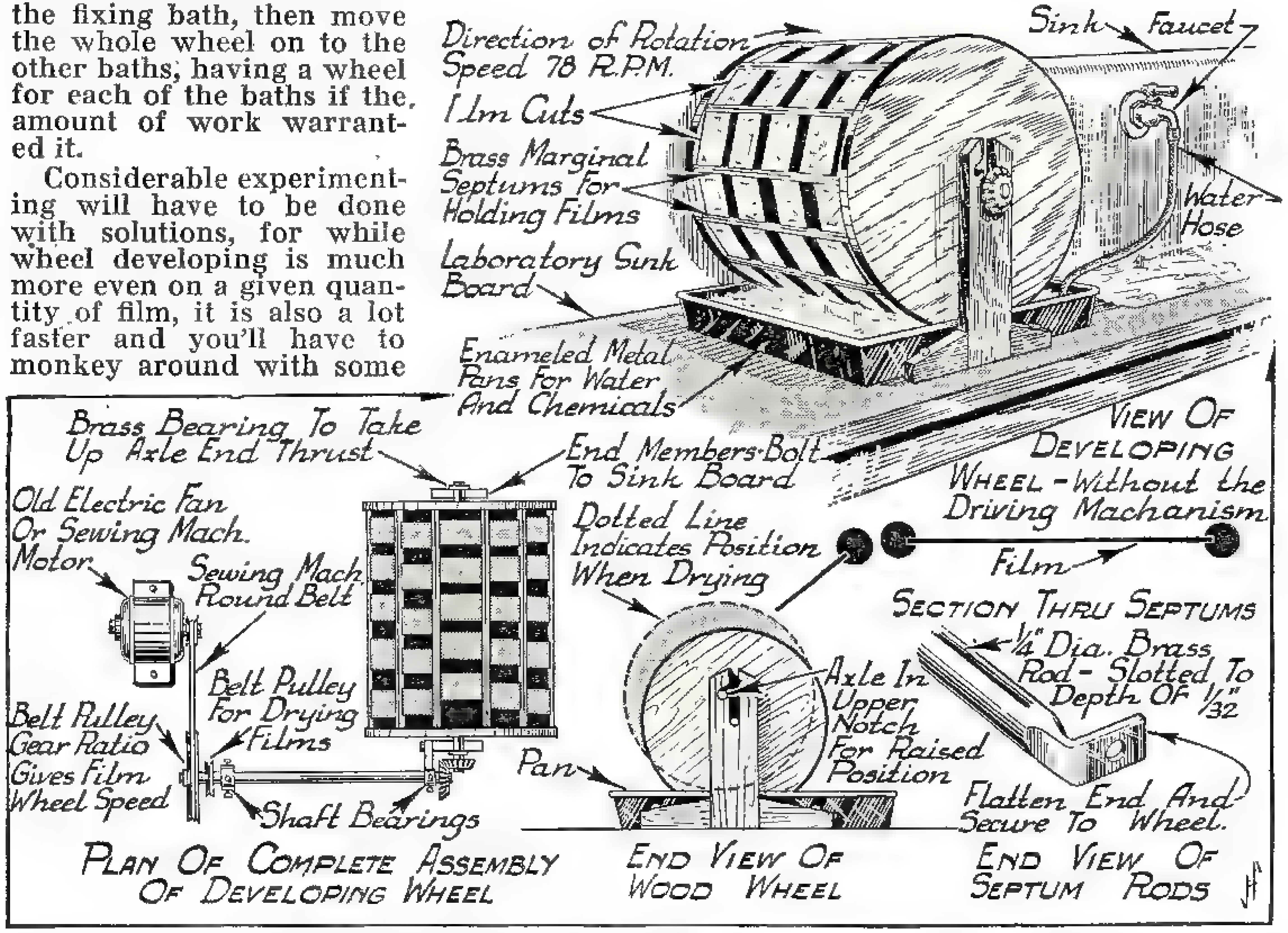
Considerable experimenting will have to be done with solutions, for while wheel developing is much more even on a given quantity of film, it is also a lot faster and you'll have to monkey around with some sample shots to find the right normalcy of solution for the most effective work.

One kink which the amateur is generally not aware of is used by professionals in drying prints. That is bathing them in alcohol briefly after they have been thoroughly washed, and then ironing them out on enamel plates with a squeegee.

The alcohol takes the water into solution, and the print then dries with only the water of inclusion and the surface alcohol remaining to be evaporated. This will give glossy prints, and if you cannot find enamel plates with the baked enamel faces like automobile mudguards look when new, you can use plate glass as effectively.

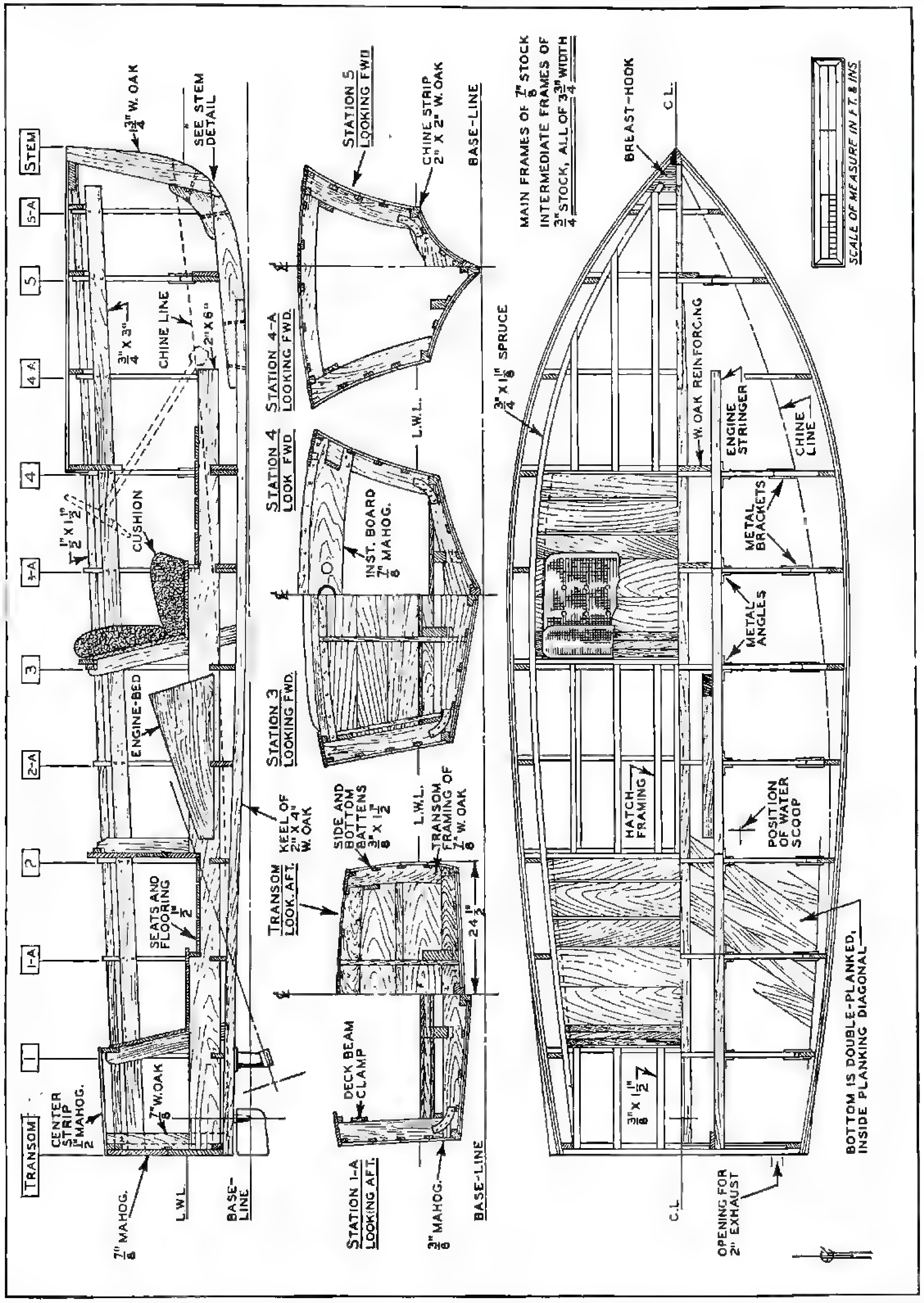
Prints after they have been partially dried in a machine like this should be press dried in blotting paper sold for the purpose by photographic supply stores.

Frequently the amateur, and the professional as well, is troubled with prints curling after drying, owing to inequalities of surface tension set up by the emulsion. Large plants have devices which run the print through a series of rollers and so remove the curl. The same effect can be secured by immersing prints for not less than five minutes, between washing and drying, in a bath composed of one part glycerin to seven parts water.


Direction of Rotation
Speed 78 R.P.M.
Film Cuts
Brass Marginal Septums For Holding Films
Laboratory Sink Board
Enameled Metal Pans For Water And Chemicals
Sink
Faucet
Water Hose
VIEW OF DEVELOPING WHEEL - Without the Driving Machanism
Brass Bearing To Take Up Axle End Thrust
End Members Bolt To Sink Board
Old Electric Fan Or Sewing Mach. Motor
Sewing Mach. Round Belt
Belt Pulley For Drying Films
Belt Pulley Gear Ratio Gives Film Wheel Speed
Shaft Bearings
PLAN OF COMPLETE ASSEMBLY OF DEVELOPING WHEEL
Dotted Line Indicates Position When Drying
Pan
Axle In Upper Notch For Raised Position
END VIEW OF WOOD WHEEL
Film
SECTION THRU SEPTUMS
1/4" Dia. Brass Rod - Slotted To Depth Of 1/32"
Flatten End And Secure To Wheel.
END VIEW OF SEPTUM RODS

Upper right is a view showing the developing drum with tray under for washing of negatives. The cross sections show the manner of grooving used in the brass rod septums. The ends of the rods are flattened and drilled for screws to hold them to the discs. A suggested drive is shown to the lower left. Note the method of raising axle.

Scram's Simple Construction Is Strongest, Lightest and Tightest Known


STEM
5-A
5
4-A
4
3-A
3
2-A
2
1-A
1
TRANSOM
1 3/4" W. OAK
SEE STEM DETAIL
CHINE LINE
3/4" X 3"
2" X 6"
1/2" X 1 1/2"
CUSHION
ENGINE-BED
SEATS AND FLOORING 1/2"
CENTER STRIP 1/2" MAHOG.
7/8" W.OAK
7/8" MAHOG.
L.W.L.
BASE-LINE
STATION 5 LOOKING FWD
CHINE STRIP 2" X 2" W. OAK
BASE-LINE
STATION 4-A LOOKING FWD.
L.W.L.
STATION 4 LOOK FWD.
INST. BOARD 7/8" MAHOG.
STATION 3 LOOKING FWD.
KEEL OF 2" X 4" W. OAK
SIDE AND BOTTOM BATTENS 3/8" X 1 1/2"
L.W.L.
TRANSOM FRAMING OF 7/8" W. OAK
TRANSOM LOOK. AFT.
24 1/2"
DECK BEAM CLAMP
STATION 1-A LOOKING AFT.
3/8" MAHOG.
BASE-LINE
MAIN FRAMES OF 7/8" STOCK INTERMEDIATE FRAMES OF 3/4" STOCK, ALL OF 3 3/4" WIDTH
3/4" X 1 1/8" SPRUCE
BREAST-HOOK
C.L.
W. OAK REINFORCING
ENGINE STRINGER
CHINE LINE
METAL BRACKETS
METAL ANGLES
HATCH FRAMING
POSITION OF WATER SCOOP
3/8" X 1 1/2"
C.L.
OPENING FOR 2" EXHAUST
BOTTOM IS DOUBLE-PLANKED, INSIDE PLANKING DIAGONAL
SCALE OF MEASURE IN FT. & INS.

Here is the construction plan of "Scram." Don't ask us to figure the bill of lumber for you; you can easily dope this out from the scantlings and sizes shown above. Topside planking is 3/8" Honduras mahogany, bottom double planked of 3/8" diagonal spruce with 3/8" fore and aft mahogany outside. The fittings for the struts and the casting for the rudder and rudder stock can be furnished by our Experimental Station. The motor plans of conversion will be run next month, complete in all details.

"Scram" in action reveals a brilliant boat with the so-called "level riding" any good design must exhibit, and as well has thundering speed for a craft so tiny. Here she is pushing the forty mark. Sweet running, and smooth, too.

PLANS for "SCRAM"

PART II

Here is the second installment of Westy Farmer's most popular boat design. Further notes on her construction, with added plans and photographs, are shown in this month's chapter.

LAST month we took you for a ride in this fiery little, sleek little, inexpensive little thunder boat, and got you started along proper lines in building her. This month we continue but before describing how the frames are got out let's have a word for the men who are here meeting *Scram* for the first time:

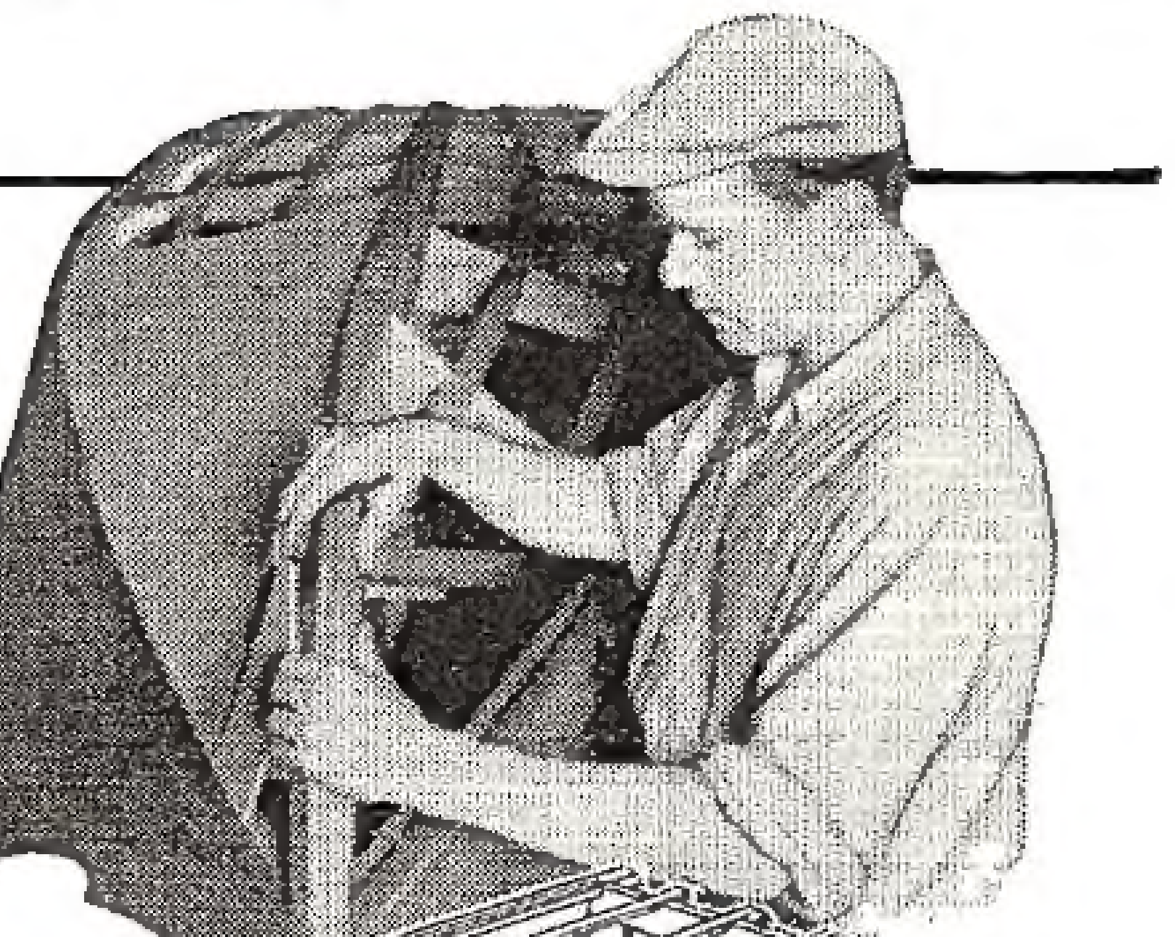
She is 15½ feet long by 5 ft. 2½" beam, by about 15" draft. Powered with a Ford Model A engine (which we'll later show how to convert into a 65 h.p. high duty marine mill) *Scram* is easily capable of leaving all present day two-cockpit runabouts of her size in the lurch when it comes to speed. She banks her turns like an airplane and is a sure cure for all who crave real speed thrills.

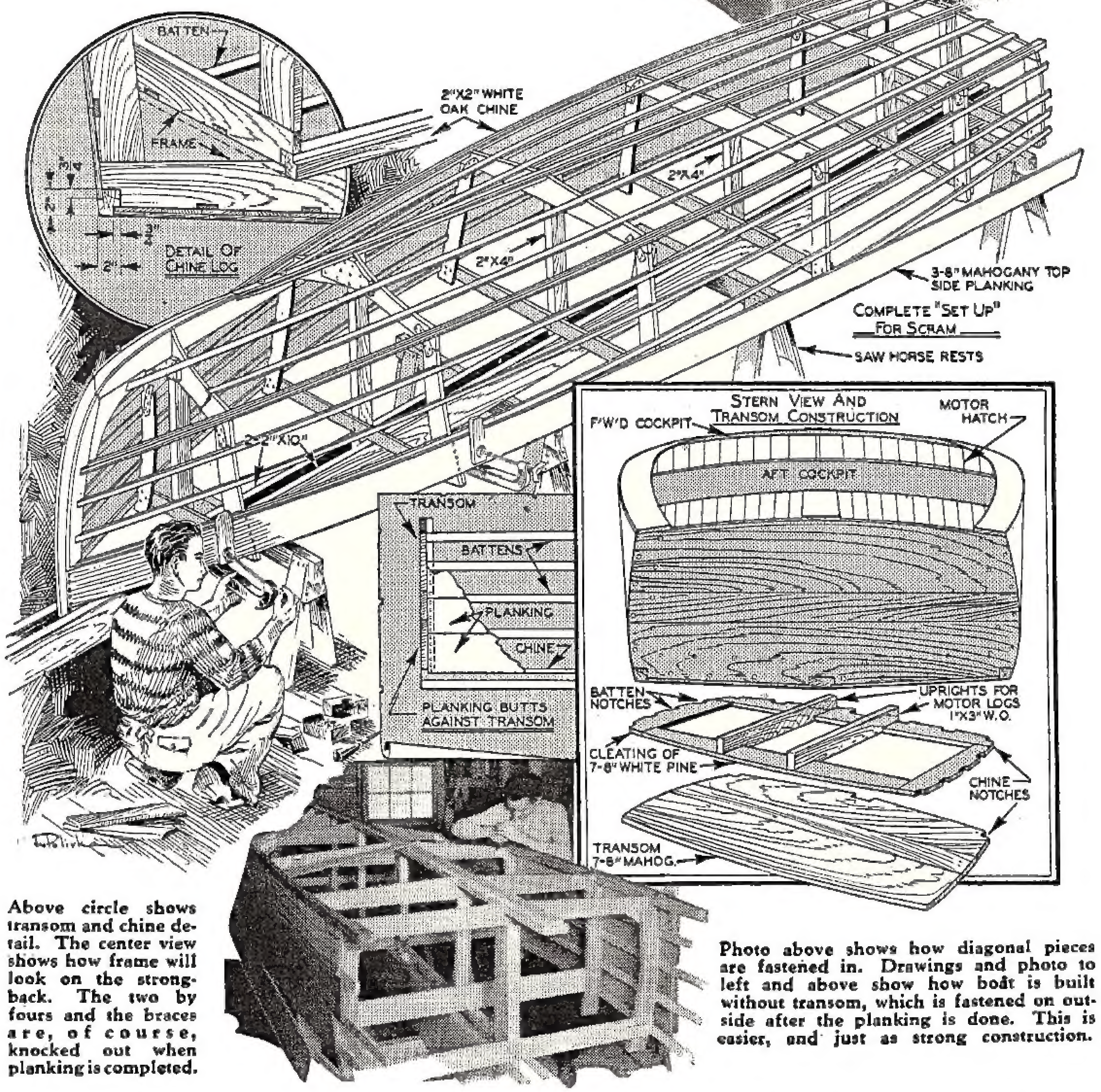
Best of all is the matter of the motor. We are working out a list of costs on the matter of finished machined castings and parts needed to take a raw Ford A block assembly, costing $59 new, and turn it into a hot marine engine—not a makeshift, but a real one. You will be pleased to know that the whole engine can be made for about what a good used large model outboard can be bought for.

The Ford motor as it stands can be converted three ways: it can be put in a boat just as it comes from a car, where it'll weigh close to 600 lbs. and take up half the boat, developing 30-38 h.p. You can convert it a second way, using Ford parts and putting on an oil cooler and reverse gear. This is but little better. Then there is the way we have doped it out: deep base, oil cooler, high compression head, cooled manifold, downdraft and reverse gear.

Last issue we ran her lines, outboard profile, pictures of the boat in action, and showed how to lay the lines down. If you have followed us this far you are now ready to rough out the frames.

Showing Complete Frame Details




BATTEN
FRAME
2"X2" WHITE OAK CHINE
¾"
2"
DETAIL OF CHINE LOG
2"X4"
2"X4"
3-8" MAHOGANY TOP SIDE PLANKING
COMPLETE "SET UP" FOR SCRAM
SAW HORSE RESTS
2"x2"X10"
TRANSOM
BATTENS
PLANKING
CHINE
PLANKING BUTTS AGAINST TRANSOM
STERN VIEW AND TRANSOM CONSTRUCTION
F'W'D COCKPIT
MOTOR HATCH
AFT COCKPIT
BATTEN NOTCHES
UPRIGHTS FOR MOTOR LOGS 1"X3" W.O.
CLEATING OF 7-8" WHITE PINE
CHINE NOTCHES
TRANSOM 7-8" MAHOG.

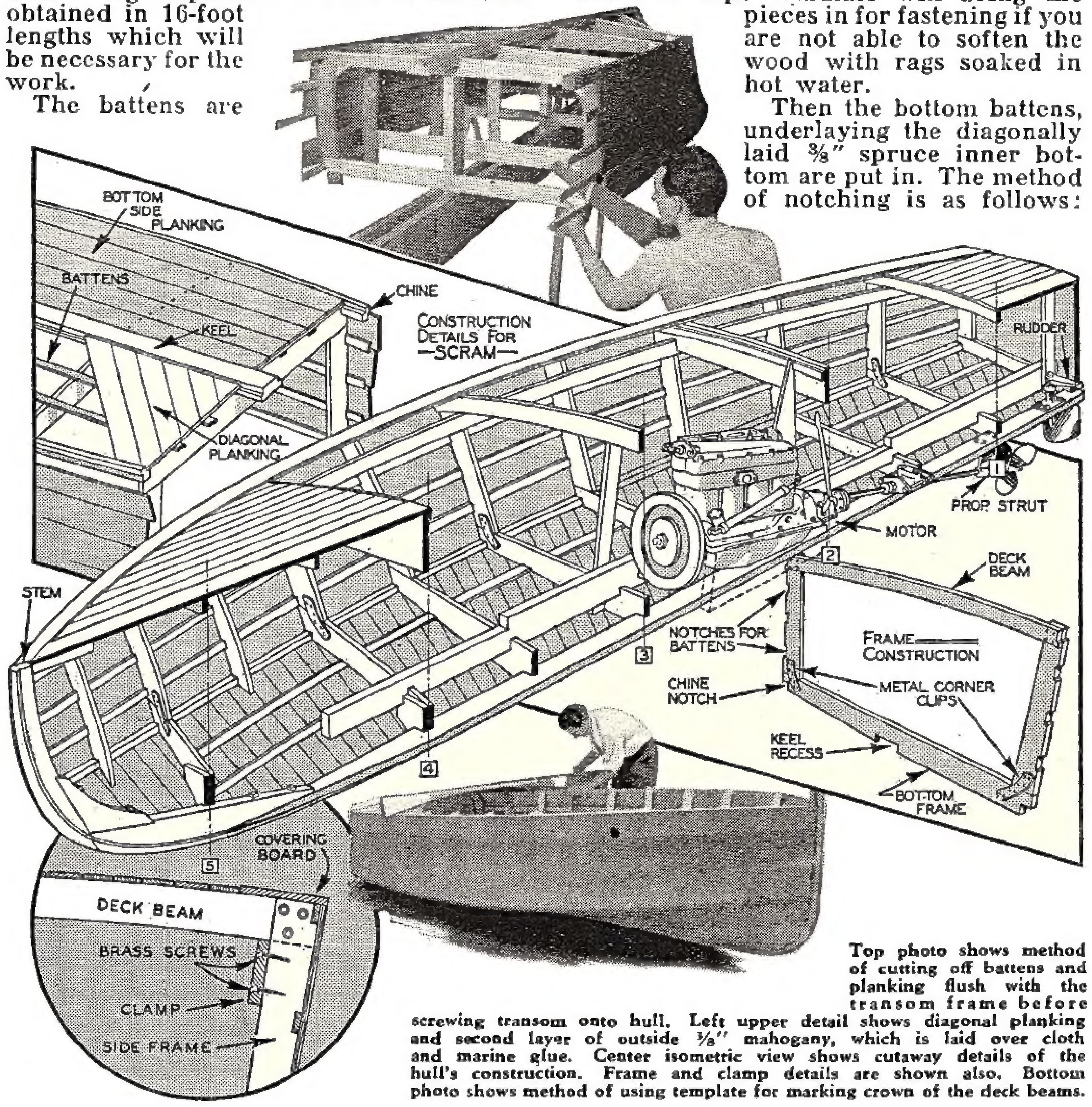
Above circle shows transom and chine detail. The center view shows how frame will look on the strongback. The two by fours and the braces are, of course, knocked out when planking is completed.

Photo above shows how diagonal pieces are fastened in. Drawings and photo to left and above show how boat is built without transom, which is fastened on outside after the planking is done. This is easier, and just as strong construction.

Turn to page 116 to the construction cut shown on that page. You will see that the frames used for making the molds, or for building the boat in other words, are at stations 5, 4, 3, 2 and 1. Now look at this page. Here you will see how the frames have been cross tied at the open part across the top, and how a 2" by 4" of some straight but scrap wood has been mortised so that the frame could be rigidly mounted on it. The 2" by 4" is held in line by two strongback pieces upon which the frame is set up. The frames are properly spaced out on this strongback, and the intermediate frames are placed in the boat after the planking is done. This saves a lot of fairing and fitting which would otherwise go to waste. The number of frames indicated are amply strong for building the boat.

The stem is cut and rabbetted as per the drawing on page 119, which shows how the rabbet is cut and how the clamps join the breasthook. It is easier to make little brass clips for the heels of the frames than to lap the heels of the frames together.

We can furnish you these clips cast in aluminum if you care to write us. The cost is moderate and the labor saved is enormous. Also the resulting job is stronger than as though the heels of the frame at the chine were riddled with screws in the wood that remains after the mortise for the chine piece has been cut.


BOTTOM SIDE PLANKING
BATTENS
KEEL
CHINE
DIAGONAL PLANKING
CONSTRUCTION DETAILS FOR —SCRAM—
STEM
RUDDER
PROP STRUT
1
MOTOR
2
DECK BEAM
3
NOTCHES FOR BATTENS
FRAME CONSTRUCTION
CHINE NOTCH
METAL CORNER CLIPS
KEEL RECESS
4
BOTTOM FRAME
5
COVERING BOARD
DECK BEAM
BRASS SCREWS
CLAMP
SIDE FRAME

Top photo shows method of cutting off battens and planking flush with the transom frame before screwing transom onto hull. Left upper detail shows diagonal planking and second layer of outside ⅜" mahogany, which is laid over cloth and marine glue. Center isometric view shows cutaway details of the hull's construction. Frame and clamp details are shown also. Bottom photo shows method of using template for marking crown of the deck beams.

The transom frame is put up at the same time as the others.

The notches for the battens are done after the frames are up. There are four planks on the topsides, equally spaced in width at the frames. The battens are ⅜" by 1½" white oak. They may be spliced with feather edged splices if the stuff cannot be obtained in 16-foot lengths which will be necessary for the work.

The battens are let in flush with the edges of the frame, which has, of course, been trimmed off the thickness of the planking as the lines are given to the outside of the planking.

The stock for the frames is ⅞" x 3¾" mahogany on the main frame set ups, and ¾" by 3¾" on the intermediate frames which are put in later.

The battens are feather edged into the stem, and all fastenings are countersunk, being brass screws, No. 7, ¾" long on the battens. Also the same for the clips at the frame heels.

Chine Is Next

The next piece of wood to be put in is the chine. This is a piece of 2" x 2" white oak, or preferably mahogany. Anchored to the transom through the corner edge of the chine piece, liberally countersunk (No. 8, 1½" f.h. brass screw) the piece is successively fastened to the frames as they run forward, and is tapered and cut a bit toward the stem to make bending easier. A rope windlass will bring the pieces in for fastening if you are not able to soften the wood with rags soaked in hot water.

Then the bottom battens, underlaying the diagonally laid ⅜" spruce inner bottom are put in. The method of notching is as follows: Cut one notch in the frame forward. Spring the batten back over the frames, mark the spot it crosses each frame, then saw to the inside of these marks, and cut out the notch with a chisel.

The battens are allowed to run past the transom frame, as the planking, battens and all are trimmed off the last thing prior to putting on the transom itself. Why this is done will be explained later.

Topside Planking Comes First

The topside planking comes first. The chine is rabbeted on both the bottom side and the topside, a rabbet, or groove, being cut deep enough to take ¾" planking on

(Continued on page 140)

Talk with Entire Continent on this 20 METER Transmitter

Amateur radio station with 20 meter transmitter in operation.

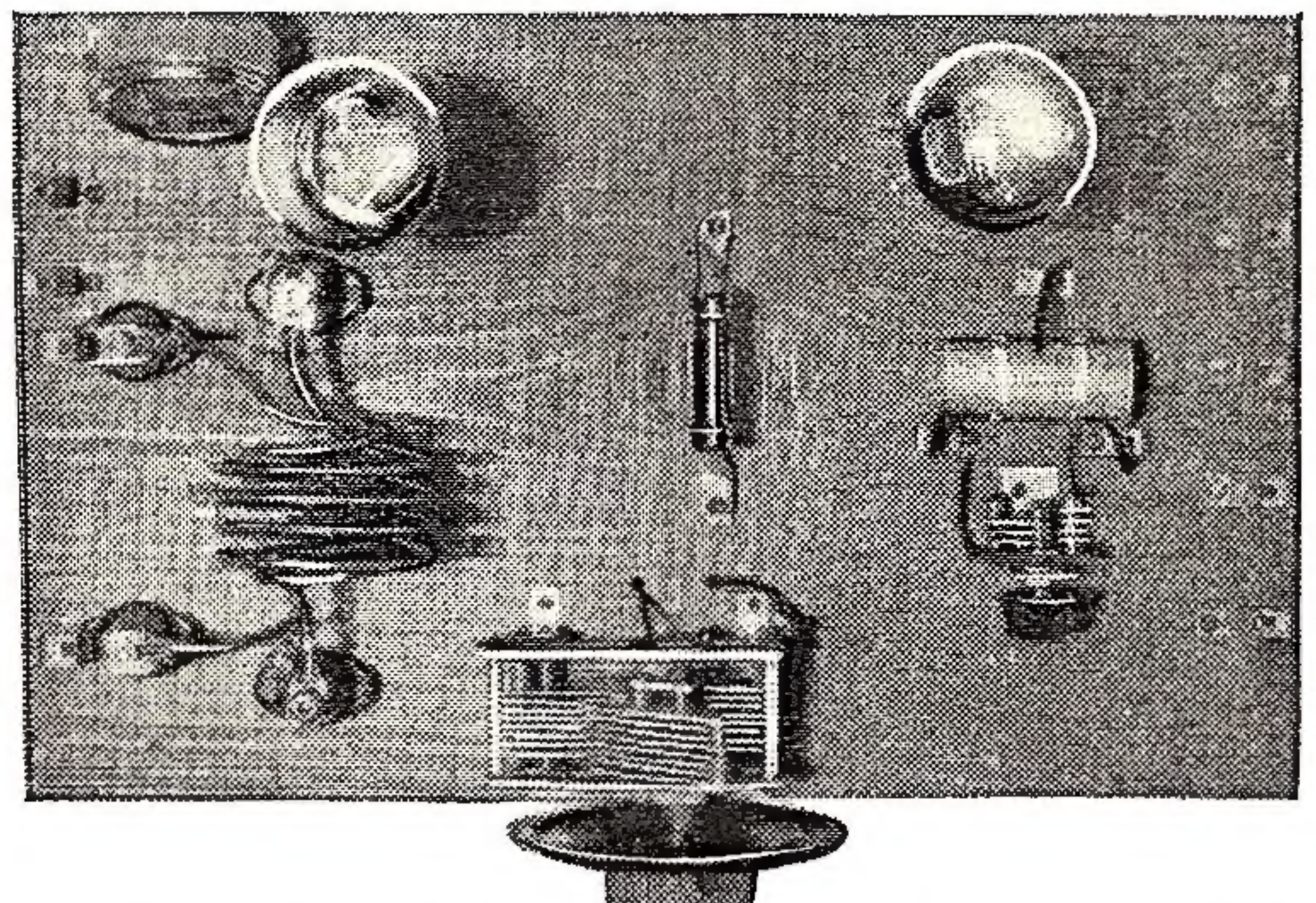


Fig. 1. Top view shows layout of parts on board.

Signals from this little transmitter, which can be built for about $5, will put you in communication with all amateurs within 2000 miles. Get on the air with it and make radio friends all over the continent.

THE little transmitter shown in the accompanying photographs and sketches has been designed for the amateur who wants to operate on the 20 meter band exclusively. The new power tubes called pentodes are used as the oscillators, a pair of them being used in a push-pull circuit.

This transmitter is for code work only. Due to the push-pull circuit and its inherent stability, using a good DC power supply, with the circuit properly tuned, the note will have nearly crystal characteristics and your reports should be consistently "Xtal, pure DC".

A pair of 247s using 500 volts will give an output of between 12 and 15 watts. Two 233 tubes at 180 volts will show considerably better than 6 watts.

The transmitter as shown, exclusive of tubes and power supply, can be built by the careful buyer for less than five dollars. Using 247s over a month's use, the set gave excellent results, and consistently contacted amateurs between 800 and 2000 miles.

Note the neat appearance. All wiring is done beneath the baseboard as seen in Fig. 4, leaving just the dominant parts above deck. This base was a single board smoothed down and cut 15 inches long by 10 inches wide.

The parts were arranged exactly as shown in Figs. 1 and 2. About 4 inches from each end and 2 inches from the rear edge place a socket as shown. Use 5 prong sockets for the filament type tubes such as the 247 or the 233. For pentodes indirectly heated (having a cathode) use 6 prong sockets. Face the two heater prongs of each socket towards each other.

Use an 0 to 200 milliammeter. To the back terminals fasten two stiff wire legs bending their ends at right angles to fit in the clips on the base provided for them. You can thus take the meter out quickly if necessary. Provide a small jumper wire with clip to shunt the meter out when keying.

The grid coil consists of a piece of wooden window shade roller 2½ inches long. Using No. 30 DCC wire, put on two separate windings of 8 turns each, as illustrated. Space the windings about 1 inch. Fasten the winding ends under the heads of pins cut off and driven into the wood. Connect the two inside turns together to form the center tap. The .000025 midget tuning condenser, of course, is mounted in front of the coil in a vertical position.

When the coil is finished flood the windings with waterproof cement so the turns will retain their position. Otherwise any

(Continued on page 136)

HOW TO BECOME A RADIO AMATEUR
Want to get on the air and talk to the whole world with your key? How to build and operate your own short wave station, how to master the code, and how to procure your radio amateur's license—everything you'll need to know is told in the booklet "How to Become a Radio Amateur" available for 25 cents at Modern Mechanix and Inventions, 529 So. 7th St., Minneapolis, Minn.

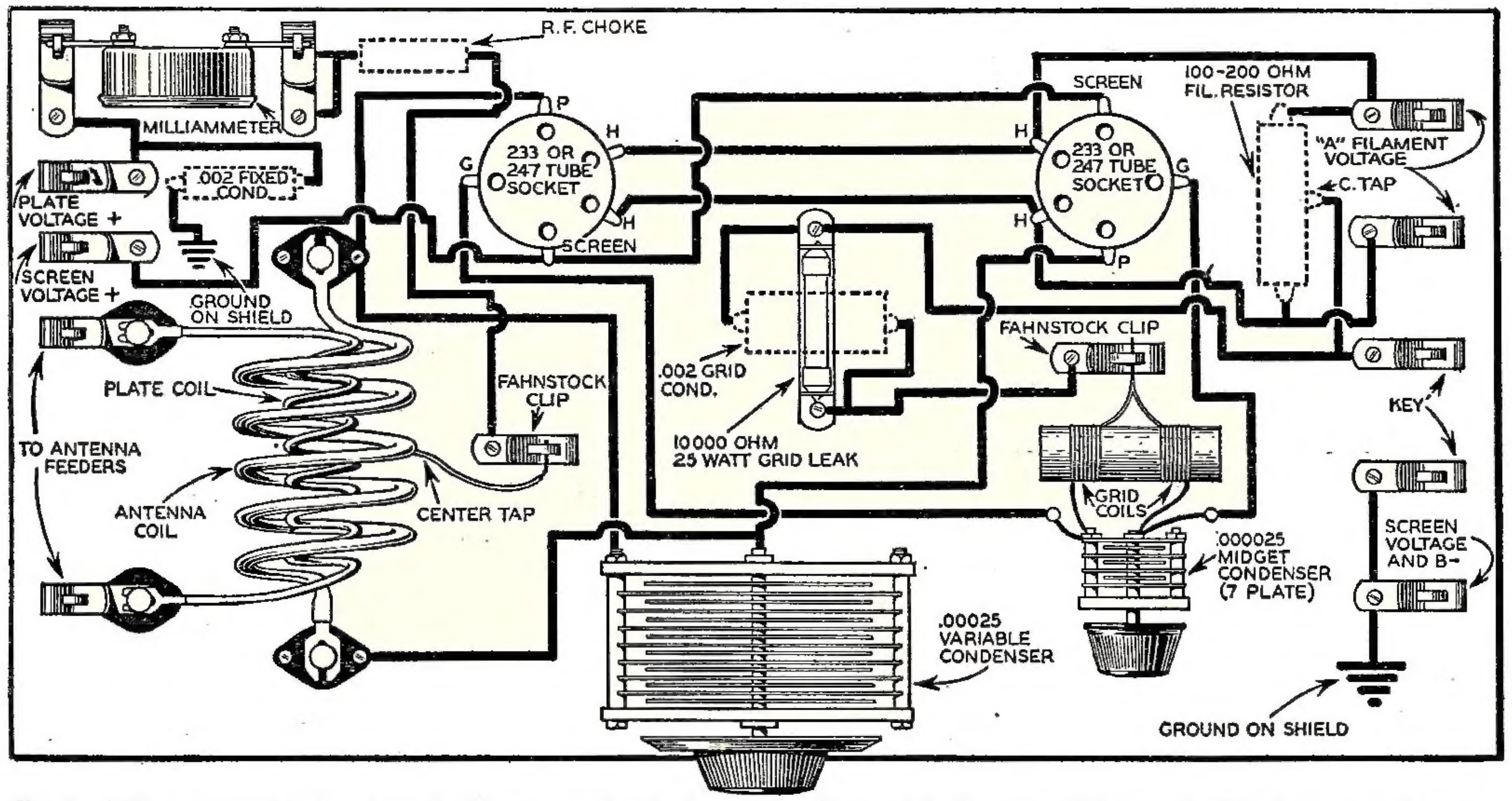

R.F. CHOKE
MILLIAMMETER
.002 FIXED COND.
PLATE VOLTAGE +
SCREEN VOLTAGE +
GROUND ON SHIELD
PLATE COIL
TO ANTENNA FEEDERS
ANTENNA COIL
CENTER TAP
P
H
G
233 OR 247 TUBE SOCKET
SCREEN
FAHNSTOCK CLIP
.002 GRID COND.
10 000 OHM 25 WATT GRID LEAK
.00025 VARIABLE CONDENSER
SCREEN
100-200 OHM FIL. RESISTOR
"A" FILAMENT VOLTAGE
C. TAP
FAHNSTOCK CLIP
KEY
GRID COILS
.000025 MIDGET CONDENSER (7 PLATE)
SCREEN VOLTAGE AND B-
GROUND ON SHIELD

Fig. 2. When secured to baseboard, all parts are hooked up according to this diagram. Fahnestock clips for external connections are disposed along sides and rear. Parts shown in dotted lines are mounted under baseboard, where all wiring is run.

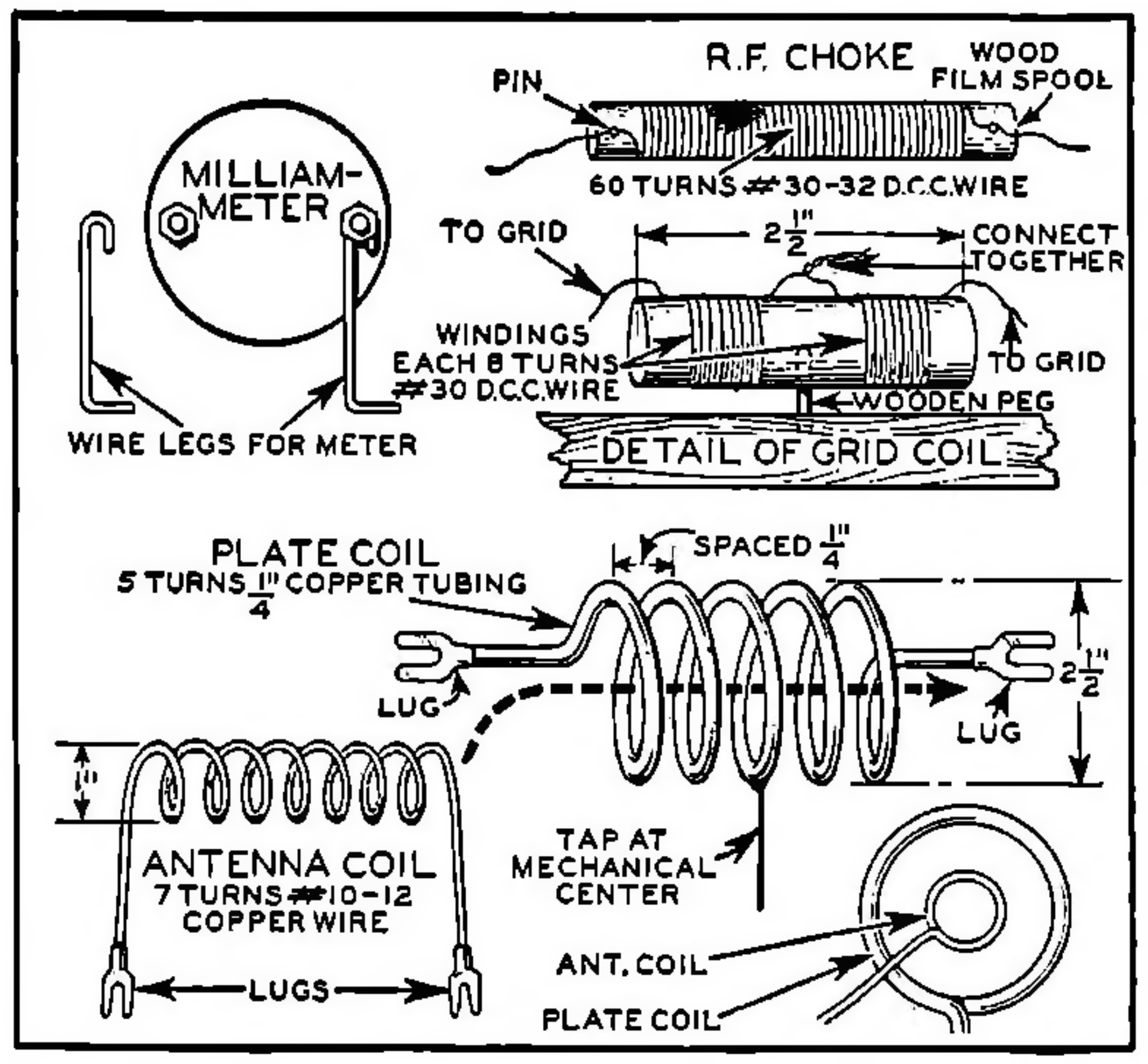
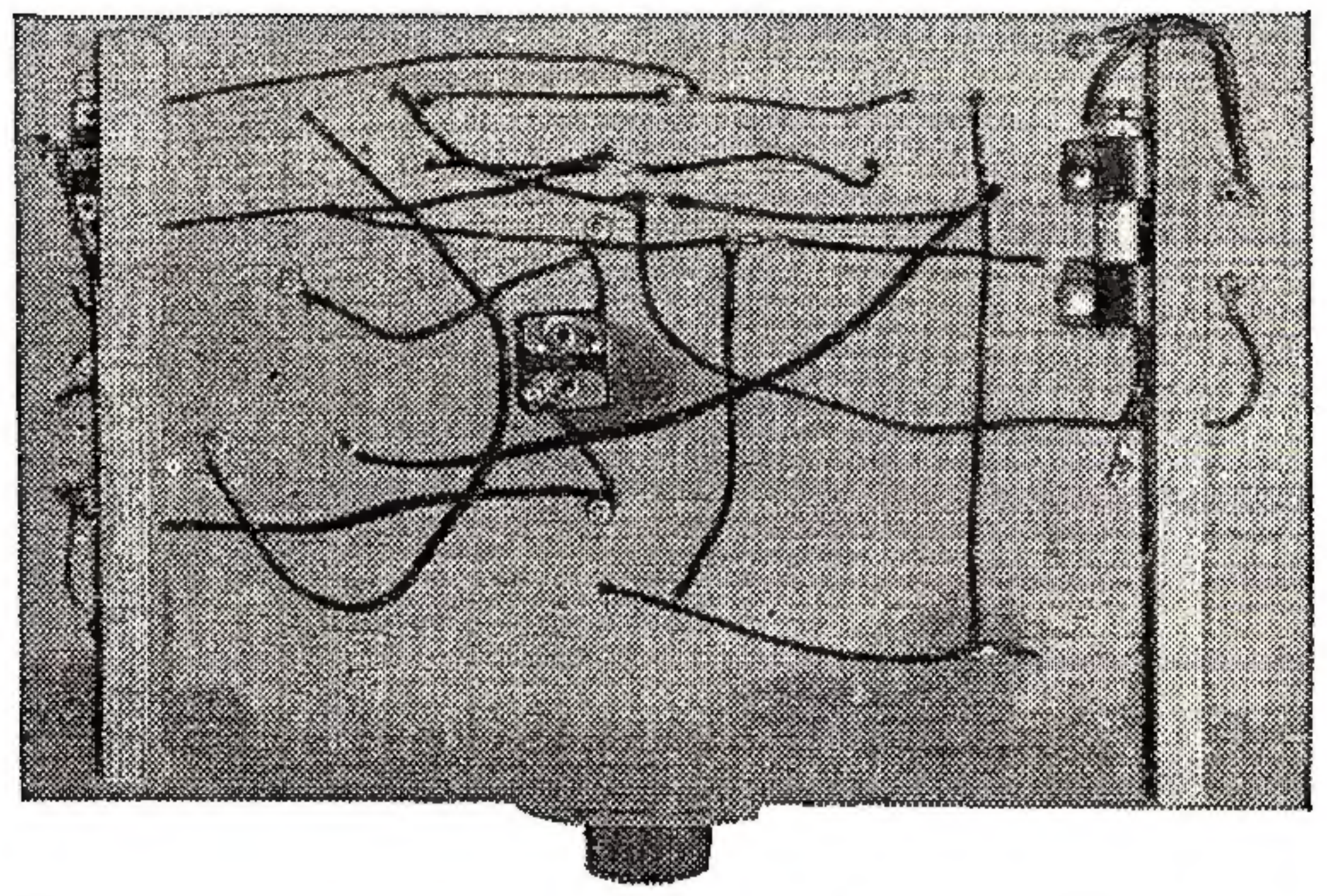

R.F. CHOKE
WOOD FILM SPOOL
PIN
60 TURNS #30-32 D.C.C.WIRE
MILLIAM-METER
TO GRID
2½"
CONNECT TOGETHER
WINDINGS EACH 8 TURNS #30 D.C.C.WIRE
TO GRID
WOODEN PEG
WIRE LEGS FOR METER
DETAIL OF GRID COIL
PLATE COIL
5 TURNS ¼" COPPER TUBING
SPACED ¼"
LUG
LUG
2½"
1"
ANTENNA COIL
7 TURNS #10-12 COPPER WIRE
LUGS
TAP AT MECHANICAL CENTER
ANT. COIL
PLATE COIL

Fig. 3. Milliammeter is supported on wire legs. Below, how plate and antenna coils are wound and fitted together.



Underside view shows how wiring is done. Note cleats which hold board up from table, allowing space for wires.

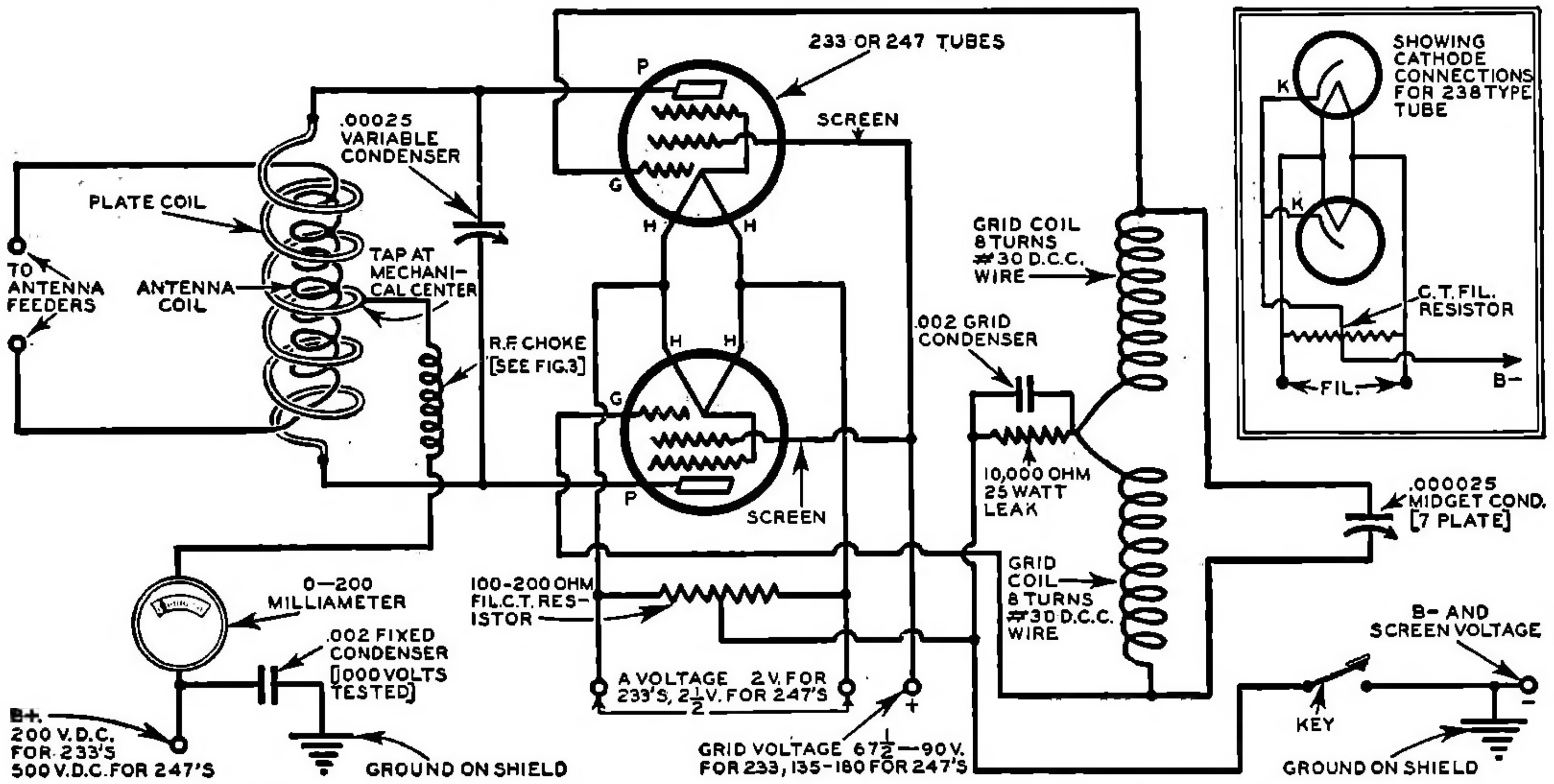
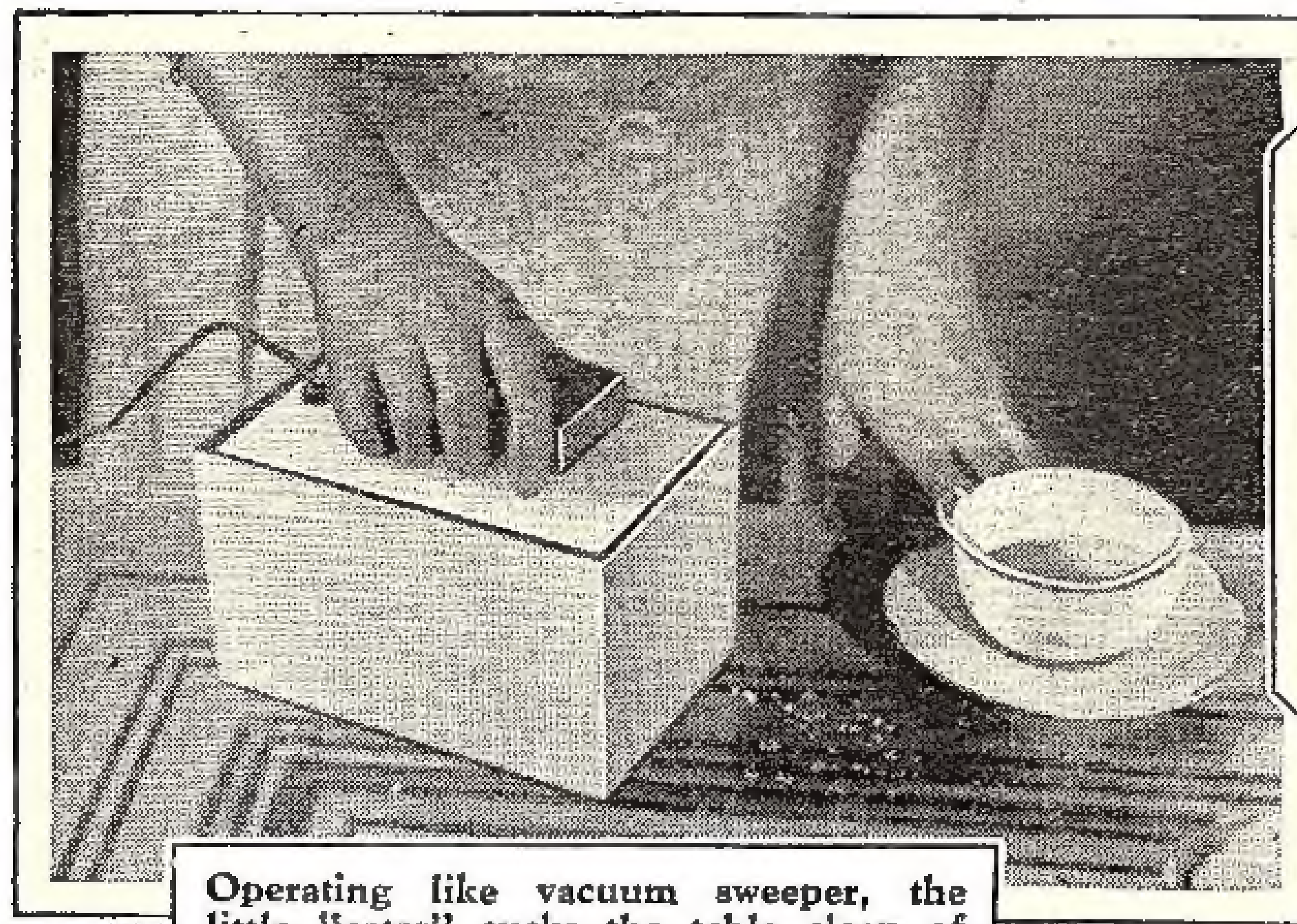
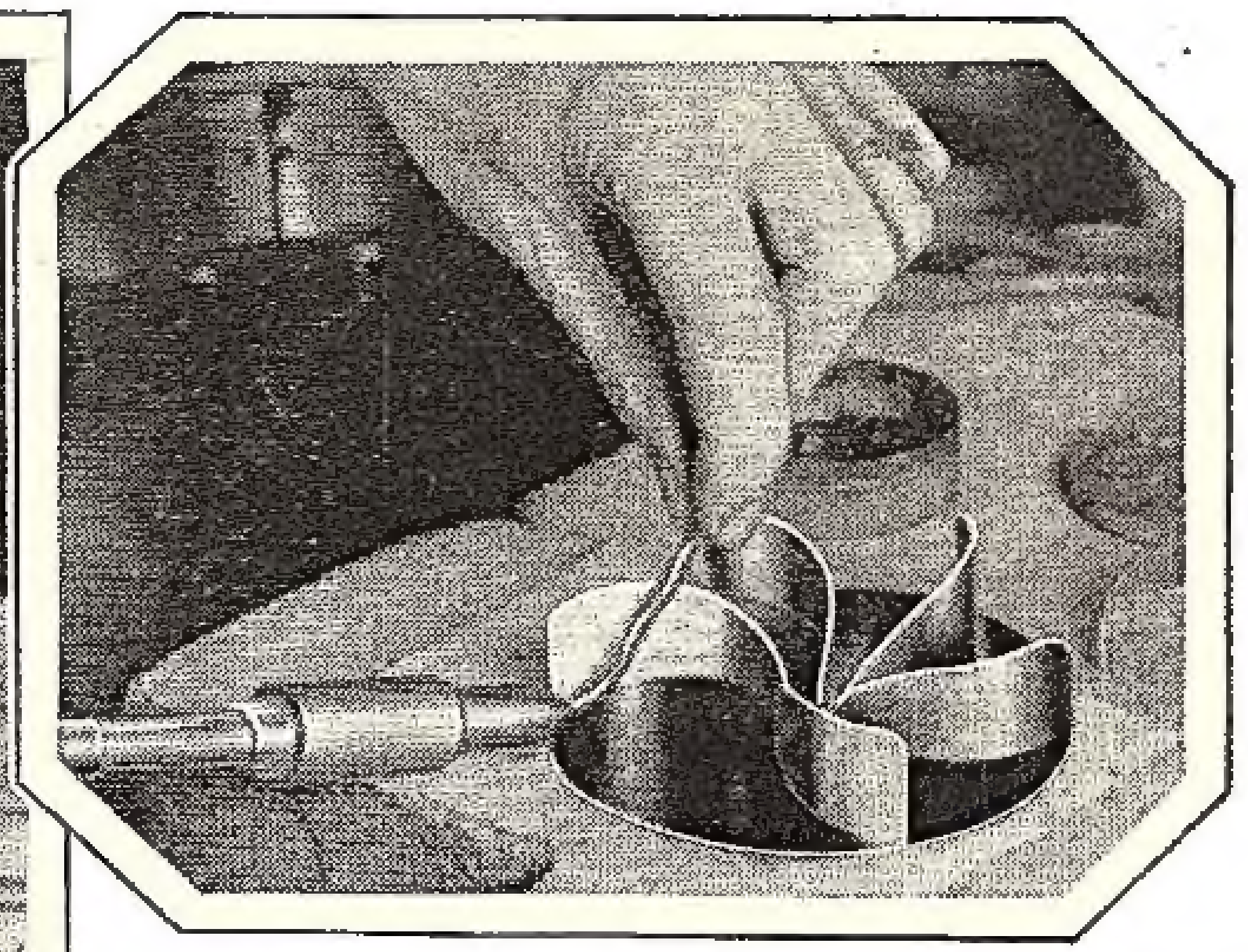

233 OR 247 TUBES
.00025 VARIABLE CONDENSER
PLATE COIL
TO ANTENNA FEEDERS
ANTENNA COIL
TAP AT MECHANICAL CENTER
R.F. CHOKE [SEE FIG.3]
P
G
H
SCREEN
GRID COIL 8 TURNS #30 D.C.C. WIRE
.002 GRID CONDENSER
10,000 OHM 25 WATT LEAK
GRID COIL 8 TURNS #30 D.C.C. WIRE
.000025 MIDGET COND. [7 PLATE]
0—200 MILLIAMETER
.002 FIXED CONDENSER [1000 VOLTS TESTED]
100-200 OHM FIL.C.T. RESISTOR
A VOLTAGE 2V. FOR 233'S, 2½V. FOR 247'S
GRID VOLTAGE 67½—90V. FOR 233, 135-180 FOR 247'S
B+. 200 V.D.C. FOR 233'S 500 V.D.C. FOR 247'S
GROUND ON SHIELD
KEY
B- AND SCREEN VOLTAGE
GROUND ON SHIELD
SHOWING CATHODE CONNECTIONS FOR 238 TYPE TUBE
K
C.T. FIL. RESISTOR
FIL.
B-

Fig. 5. Follow this diagram also when wiring up with layout scheme in Fig. 2. Lead marked to ground on shield at left may be taken directly to B minus lead, which takes both plate and screen voltage minus. Screen terminal is marked K on tubes.

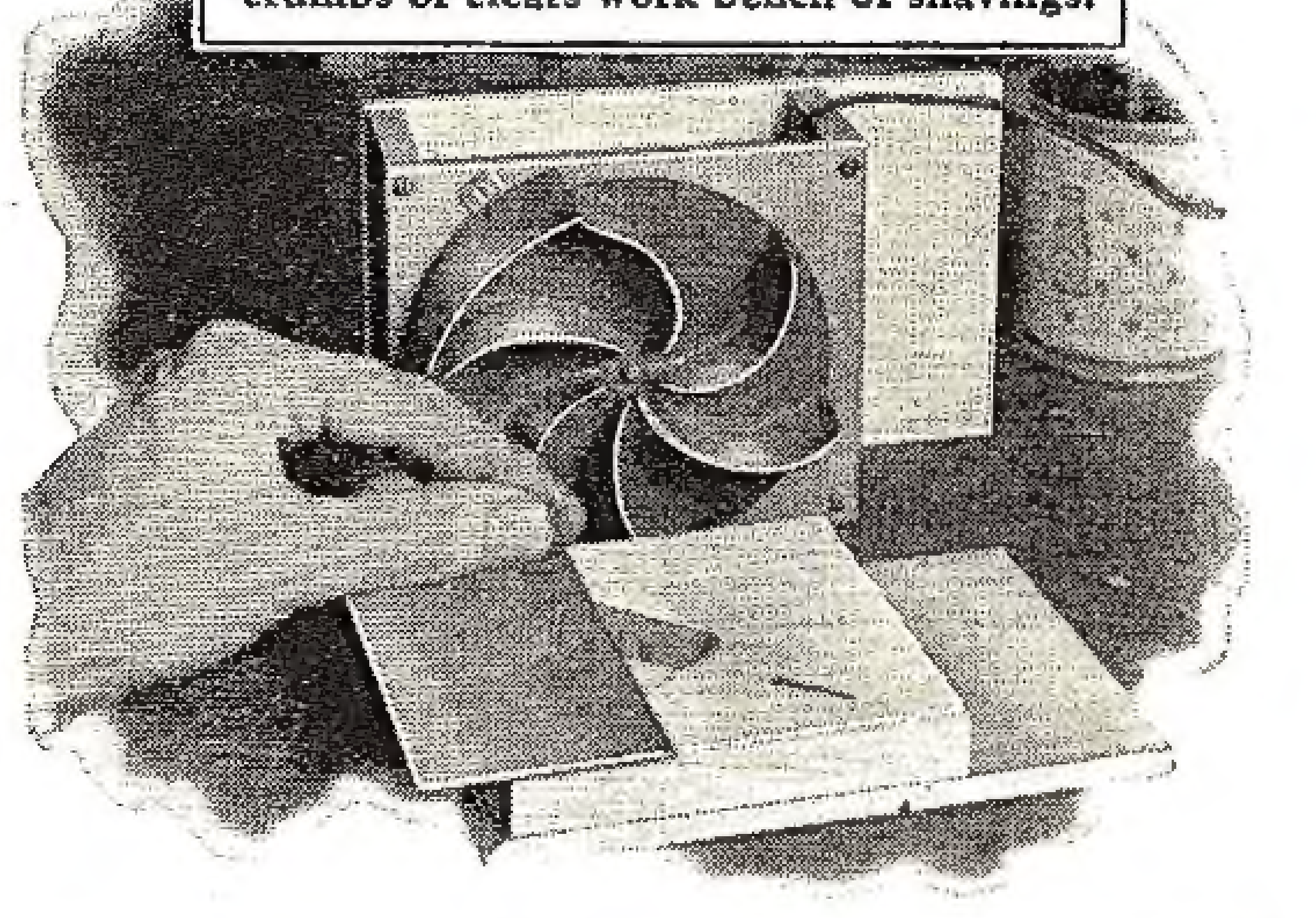
MIDGET Vacuum Sweeper Cleans Table or Workbench



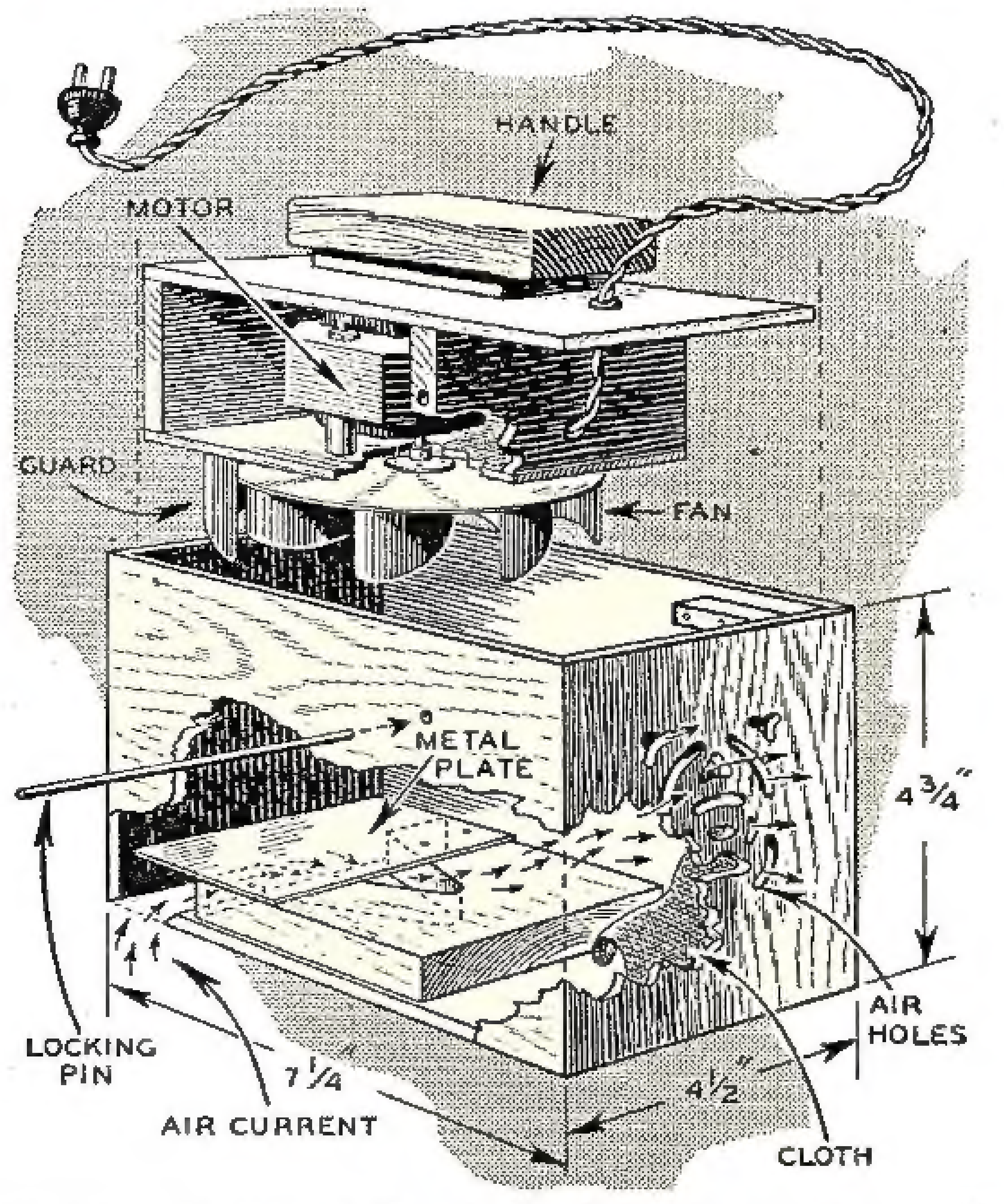
Operating like vacuum sweeper, the little "eater" sucks the table clean of crumbs or clears work bench of shavings.



Blades of fan, curved to a 2-in. radius, are soldered on the brass disc, with the small end in the center. Six blades are placed equidistantly apart.



Here's how to tack the metal plate over the block with the V-shaped notch. End notch comes under the center of fan.



Drawing shows details of the "electric crumb eater."

ALTHOUGH designed primarily for picking up bread crumbs, the midget vacuum sweeper described here has been found useful for a great many things—collecting seeds dropped from bird cages, removing lint from odd corners, gathering up sawdust and chips after home repair jobs, cleaning the shop workbench, and so on.

The motor was part of an electric mixing device obtainable at 25c stores. After the parts of the device were discarded, the motor was mounted on a square piece of ¼ in. plywood just large enough to extend a fraction of an inch beyond the fan edge. This fan is made from sheet iron or brass as illustrated in an accompanying drawing. Cut a disc 3 to 4 in. in diameter, and drill a hole in the center to fit over the motor shaft. Cut six blades to a shape that resembles half of an orange segment when seen from the side. Bend these blades until they are curved to about a 2 in. radius. Solder them at equidistant positions on one side of the disc, the small ends at the center.

They should be placed so that the convex surfaces are towards the direction of rotation of the fan when mounted on the motor shaft. A collar such as that shown in the drawings, riveted to the disc, is suitable for mounting the fan on the shaft. Now, when the motor whirls the blades, air will be drawn in at the center and thrown out at the edges.

Housing Made From Plywood

Make the housing from ¼ in. plywood, and miter the vertical corners. Then cut a lid to fit down inside the opening. Mount the motor at one end of the lid by means of two crosspieces connecting the underside of the lid and the motor board.

The crosspieces should be not less than ½ in. thick, because one of them is to have a hole bored through it for receiving a locking pin. The lid fits down inside the box, and is held in position by corner blocks at the rear end. The front end is supported by a semi-circular metal guard that is fastened in front of the fan blade.

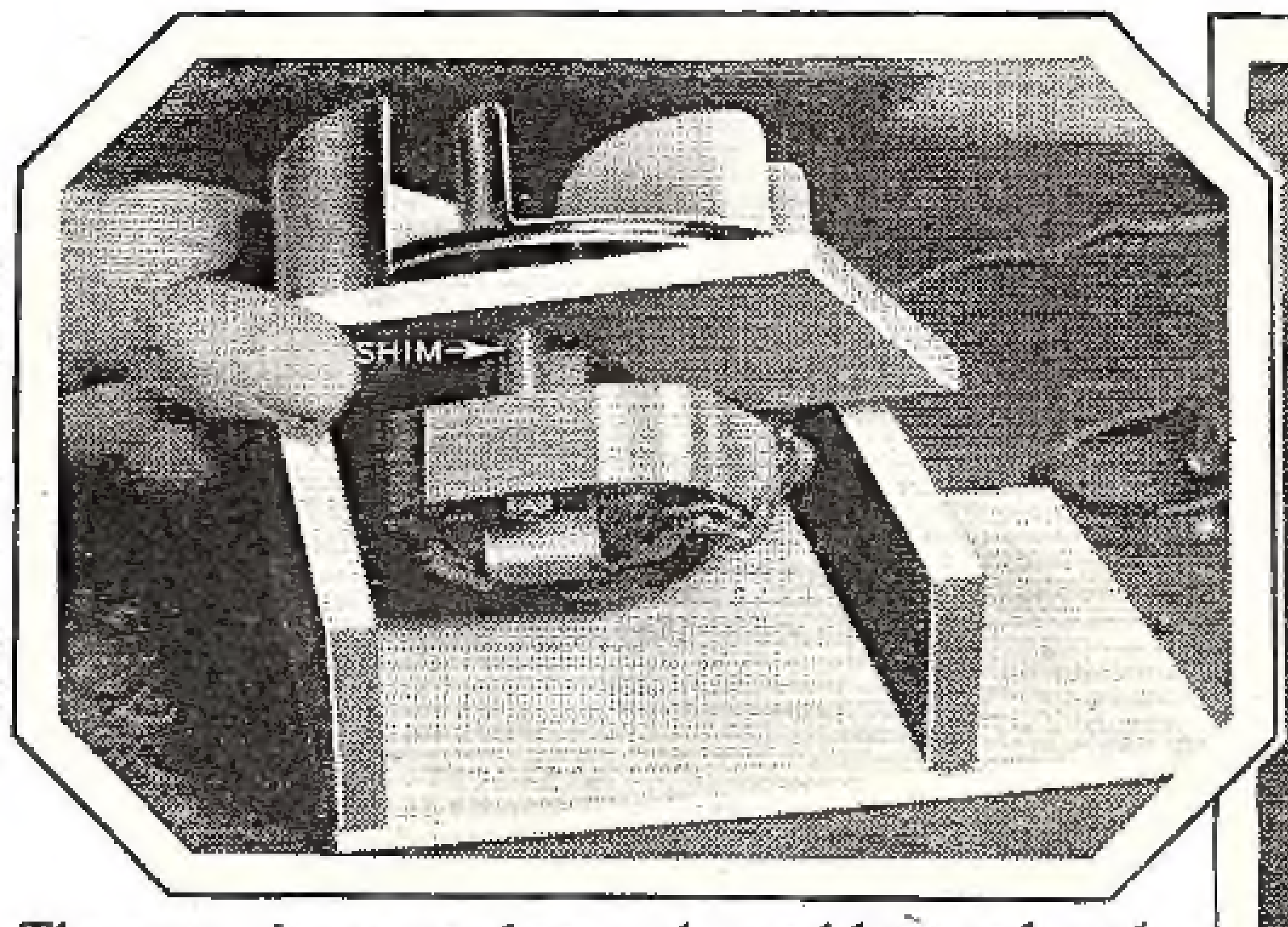
In the rear end of the crumb eater cut out a decorative design with a jig saw. The openings are to permit air to escape, and are covered with a porous cloth that catches dirt but lets the air pass.

Cut, for the bottom, a piece of plywood the exact dimensions of the lid, with the exception that it is about ½ in. shorter. This is to create a slit of "mouth" for the sweeper, at the front end.

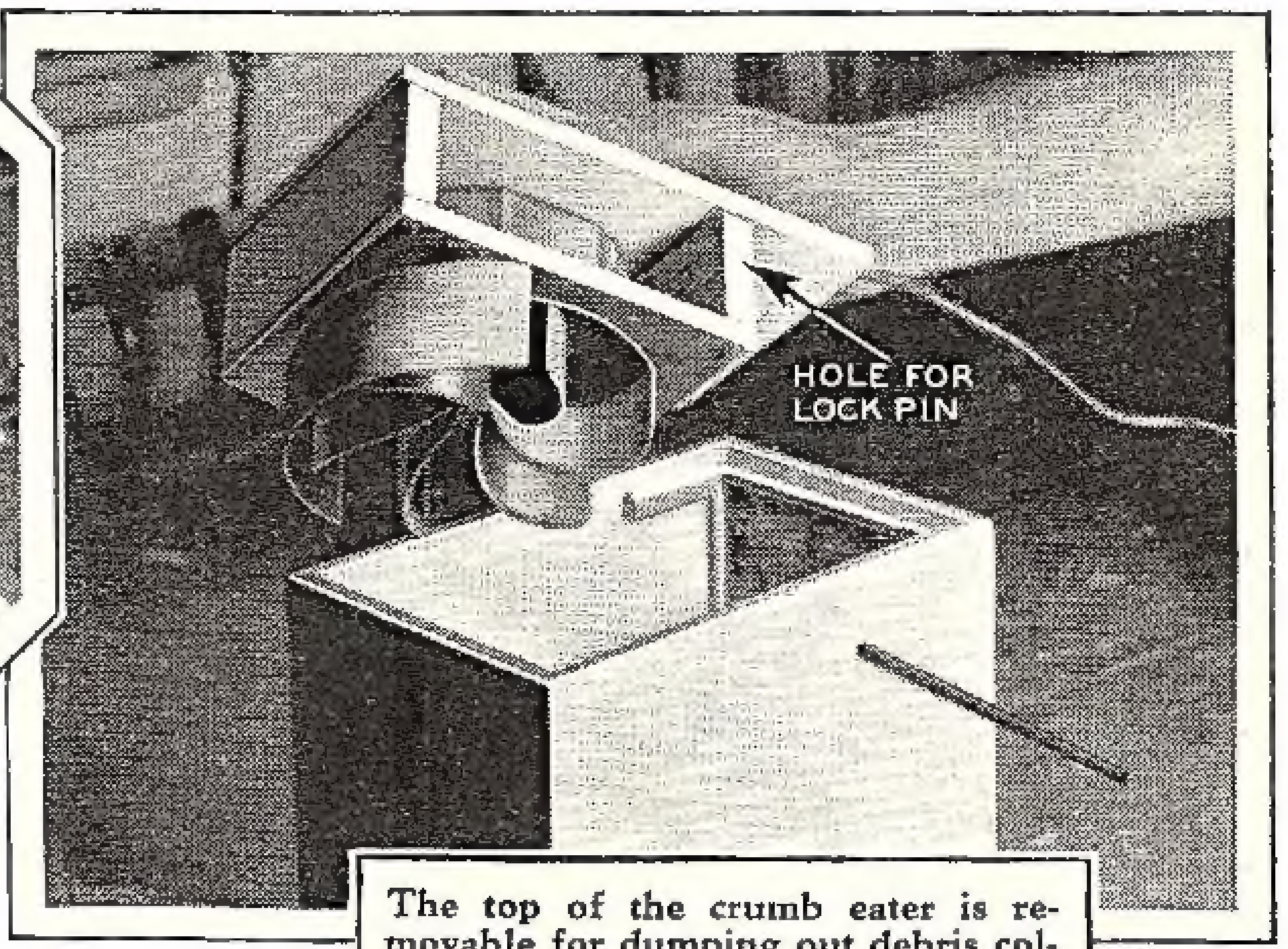
Next, make a block long enough to extend back from the slit to a point directly below the rear edge of the motor board. Then cut in it the V-shaped notch shown in the drawings. Next, cut a piece of sheet brass of such size that it will extend from the inside surface of the front end of the box to a point 1 in. from the point of the V, and will go completely across the box from one side to the other. Tack this in place. This assembly, when the bottom is fastened in the box, forms a converging air passage from the slit to the center of the fan.

After the lid is adjusted so that it fits snugly but does not bind, hold it in place

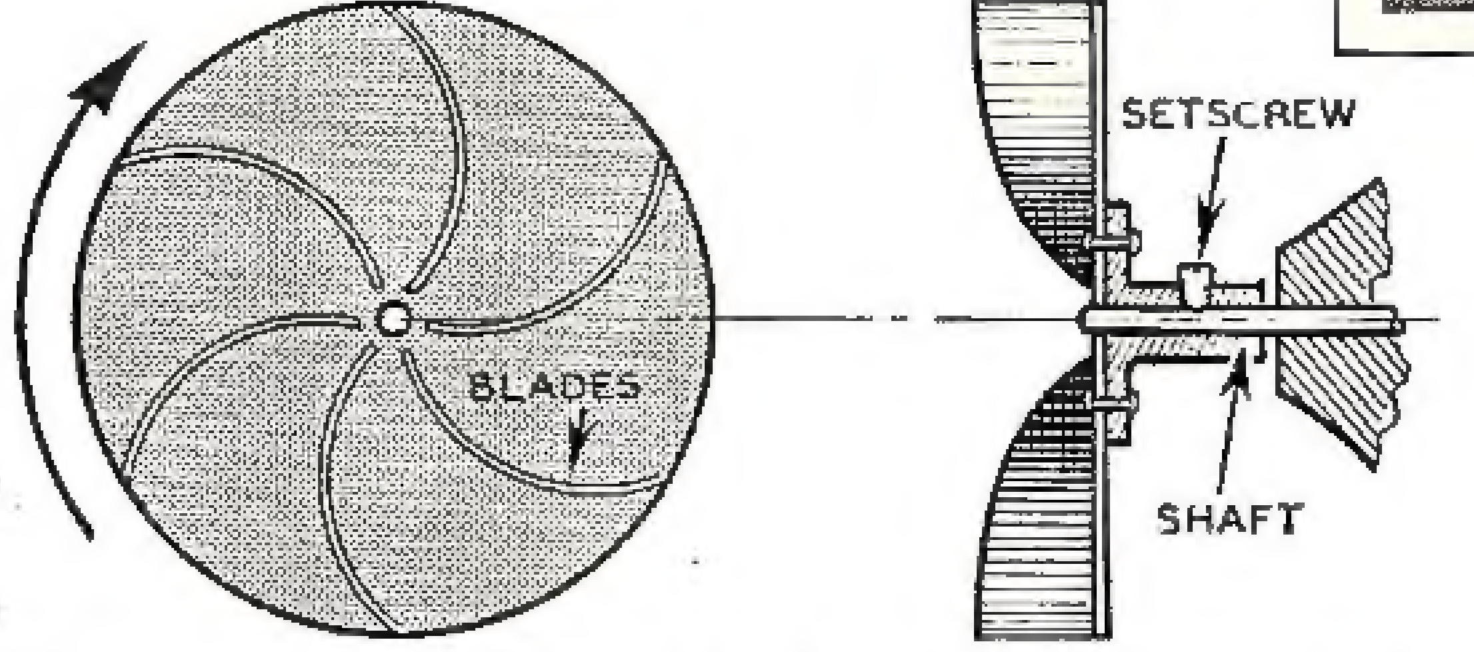
(Continued on page 142)



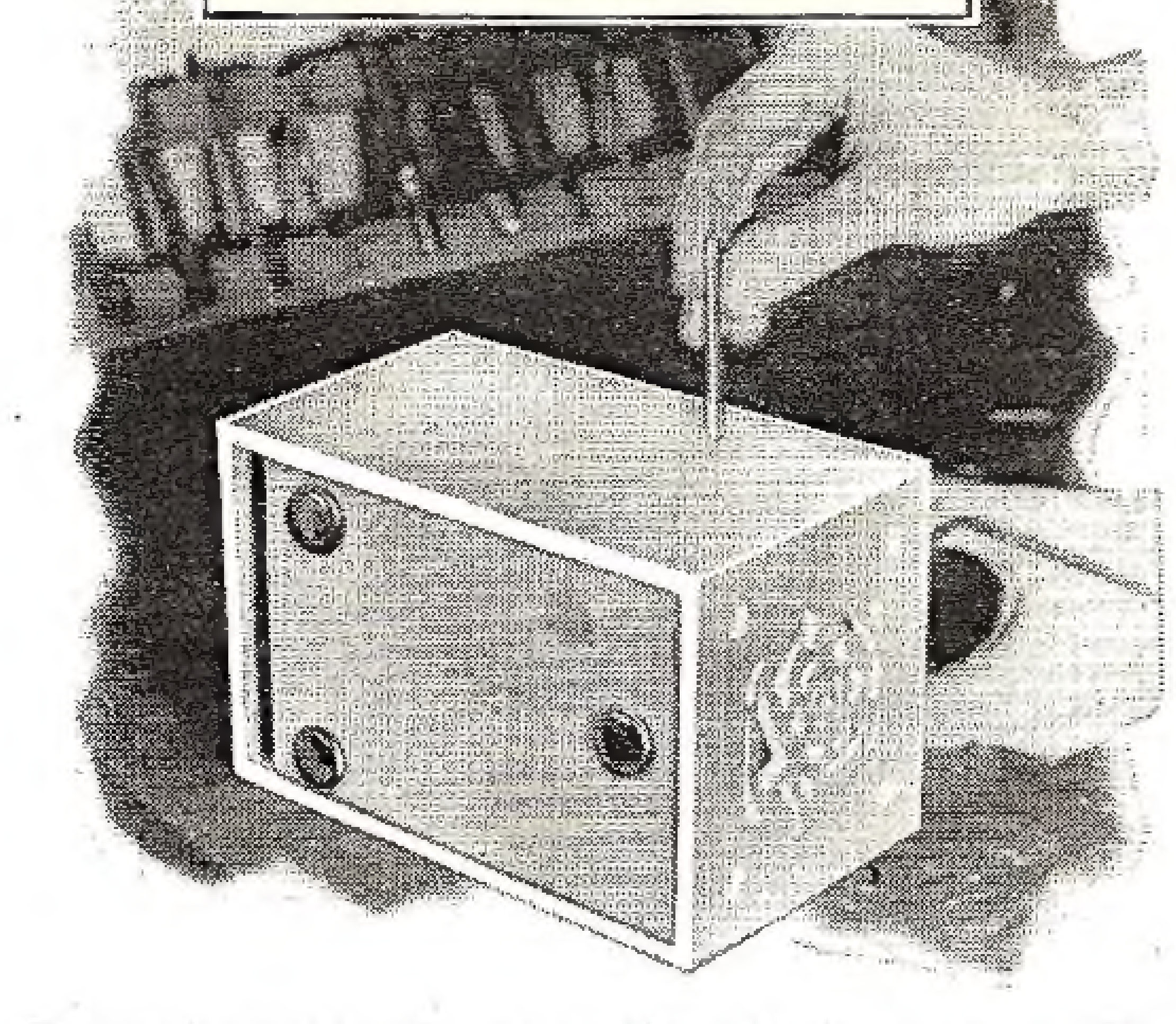
The motor is mounted on a plywood bottom board, which is mounted in turn on two crosspieces.



The top of the crumb eater is removable for dumping out debris collected in the bottom compartment.



Mount the fan blades on the brass disc in the positions shown here. The disc attaches to the motor shaft by means of a collar, to which it is riveted. Note blade curvature.

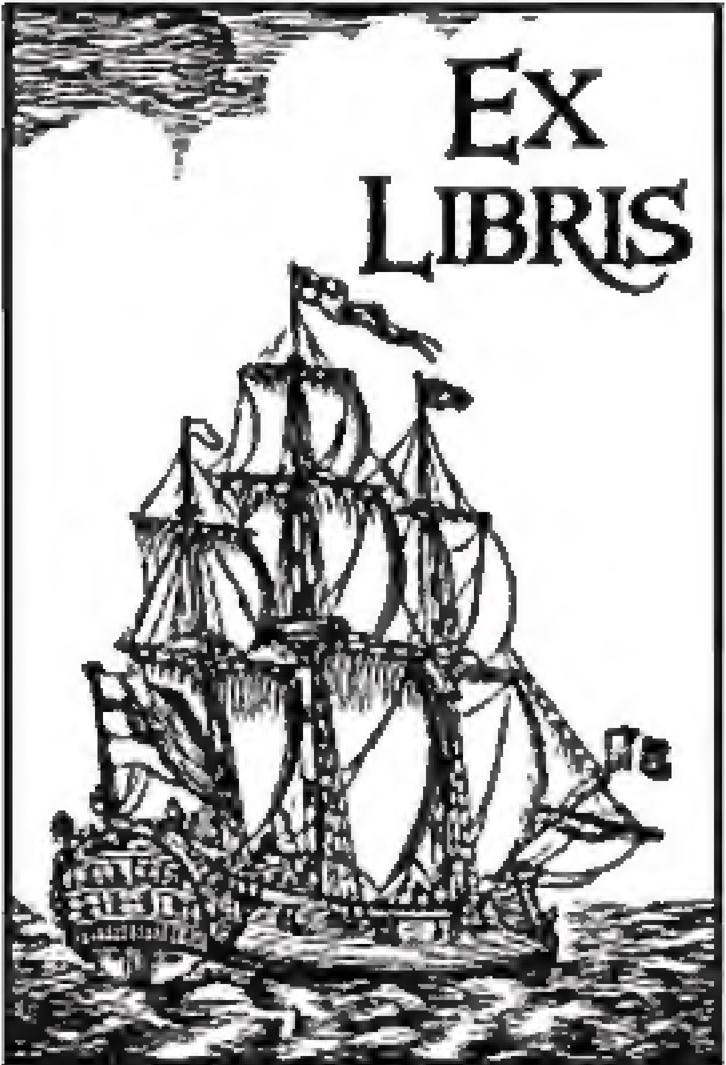


The top is held in place by locking pin shown above. The furniture slides on bottom do duty as wheels for the "eater" and hold the box correct distance above surface being swept.

Making Rubber Vacuum Cups Stick

RUBBER vacuum cups have a way of losing their grip and thus becoming almost useless. A way to restore their youthful condition is to smear them with a generous quantity of glycerine, giving especial attention to the edges. Such treatment will improve their flexibility and also their air-tightness. When stuck on a smooth surface they stay put much more firmly than if left dry. Apply a fresh coat of glycerine every once in a while.

Smear the vacuum cup with glycerine to strengthen grip.



Anon. Malefactor